INDIA RUBBER WORLD AND ELECTRICAL TRADES REVIEW

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Contributions: Of a technical nature suited to the purposes of this paper, will be liberally paid for if accepted. Correspondence relating to Rubber, Gutta Percha, Celluloid, Asbestos, etc., or any of their practical applications, is cordially invited, and the co-operation of all who make a study of these specialties either a pleasure or a duty is earnestly desired. All communications must bear the name of the writer solely as a guarantee of good faith.

Catalogues: Price Lists; Circulars; Reports of Meetings; early notices of changes in firms or corporations; views of factories, for office display; news items, particularly relating to new specialties; and local newspaper clippings (with endorsement of name and date of paper taken from), will be cheerfully received and fully acknowledged.

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The Revolution in Brazil.

THE particulars of the revolution in Brazil have been made so familiar to the public by the daily press that it is needless to repeat them here. Beyond its historical and general interest, however, the momentous event is fraught with special concern and importance to the rubber industry, for Brazil is the source of supply whence comes the chief portion of all the crude material that enters into the manufacture of rubber goods throughout the civilized world. If the change in the form of government is to cause no interruption to the production and shipment of that supply, we can join the friends of liberty everywhere in greetings of warmest congratulation to our brethern of America upon their peaceful and happy release from the tyranny of royalty and caste. But if the peace of to-day is to be followed by civil warfare, with its attendant destruction, confiscation and interruption of industry and commerce, our congratulations may soon be turned to condolence—for the unhappy fate of Brazil, as well as for our own injuries.

But we are glad to say that all the signs point to a most happy issue. The Provisional Government, which is acting sponsor for the republic to be, has now been securely in power for a full month, the national army responding cordially to its every command, and the demonstrations of sympathy from the press and the people showing more and more clearly that the change is heartily approved. Meantime, the royal family has been decorously but summarily banished from the country, and every needful precaution seems to have been taken to preserve authority, to protect life and property and to win the approval which the people seem so ready to bestow. And perhaps the most trustworthy evidence of both the popularity and stability of the change, is to be found in the fact that the industry and commerce of the country have suffered no ill effects or interruptions whatsoever. Beyond some popular excitement in the first days succeeding the change, and the subsequent tendency of prices to harden and advance a little, the markets give no appreciable evidence of the momentous revolution which has certainly taken place. Indeed, Para rubber can be bought in New York today at within one to two cents per pound of the ruling price five weeks ago, and this at a time when the available supply is about as low in volume as it has been for five years. It seems reasonable to conclude, therefore, that there is no present cause for alarm.

It is interesting, however, to note Dom Pedro's view of the situation. The only formal expression of opinion that he has given to the public since his dethronement, comes in the shape of an interview with Hon. James J. O'Kelly, a member of the English Parliament, who is a personal friend. Mr. O'Kelly cabled this interview to the New York *World*, and herewith we reproduce it in full:

"In the first place," says Mr. O'Kelly, "it is important to understand that neither the ex-Emperor nor any of his adherents regards the revolution as final."

"My visit to the United States," said the ex-Emperor, "made a deep impression on my mind. What I saw there convinced me beyond doubt of the value, the superiority, of a free government. Notwithstanding recent events in Brazil, I still adhere strongly to this opinion; but I fear the people of Brazil have not yet reached the stage of development which enables nations to derive full and free profit from free institutions. Time alone will tell, but I firmly believe it will prove the correctness of my views.

"I will not venture," he continued, "now to pass judgment on the effects of the revolution. Let the people of Brazil and history judge of it. You know I was never opposed to liberal measures. I always encouraged them, but I was above all anxious that my people should progress gradually till they reached the point which would enable them to adopt absolutely free institutions with great advantage to themselves. That time has not come yet. Now all is in the hands of God.

"I much fear that there are exaggerated political ambitions dominant in Brazil which will surely bring misfortune on the country. Both the English and the American peoples had generations of experience which cannot be improvised among an imperfectly educated nation like Brazil, whose people possess more imagination than common sense in political matters. I don't think the Brazilian people have reached anything like the stage of civilization required to fit them for absolutely free government. It is absurd to draw any analogy between them and the people of the United States. The present Provisional Government is at best an experiment which will probably result in disappointment."

"Do you propose to issue a manifesto?" inquired the *World* representative.

"I have been strongly urged to do so," was Dom Pedro's reply "but what for? Manifestos are only words, which have practical no utility in our time."

"Do you mean to go back to Brazil?"

"Yes, if the Brazilian people call me I will go back. Why not? I never authorized anybody to say I would not go back."

This is the sole political pronouncement made by Dom Pedro.

In this we see clearly the gentleness and non-combative tendencies which have always characterized the man. He has not the greatness to rise to the full stature of leadership, by proclaiming the republic which his people want, and which he grants is sure to be; just as he had not the greatness to liberate the Brazilian slaves, though he acquiesced before and after it was done. But his unresisting compliance with the demands of progress, and the kindly spirit which he manifests towards both his people and those who have deposed him, constitute a virtue rarely seen among rulers born to power. Had he been self-assertive throughout his reign, Brazil to-day would be lagging far behind on the path of progress; and were he aggressive now, the story of this peaceful revolution might be turned to one of war and bloodshed, to be followed by long years of tyrannous oppression. Civilization owes Dom Pedro little for aught that he has done in her behalf; but she owes him much, and history will accord him due credit, for all that he has left undone to her great aid.

Wanted—A Little Fearless Criticism.

THE current number of the *North American Review* contains a short article, printed in small type and stowed away in an obscure corner of the magazine, which, although it may fail in producing the ideal daily journal suggested by the writer, contains a lesson which every editor of a daily paper throughout the country may study with profit, and which in part is not without application to technical, and especially electrical journalism. The article in question is entitled "A Chance for Millionaires," and points out the necessity for a fearless, honest, clean and wholly independent daily paper. Omitting many of the arguments adduced in support of this proposition as foreign to the particular moral we wish to point, we extract the following:

"The journal of to-day is edited from the counting-room. The ideal newspaper has not yet made its appearance. The editorial and the business departments should be absolutely independent of each other. The paper should speak the truth, no matter how its advertising patronage is affected."

Electrical journals occupy a responsible position in electrical circles, and as these circles are daily widening and increasing, so do the readers of newspapers devoted to the science and its applications increase and multiply, and the influence of these organs become more wide-spreading. Many electrical men do not find time to read the technical journals at all, others merely glance over them, reading attentively only what concerns the special branch of science in which they are interested; but all who read them thinkingly and without bias, will agree with us that the influence of the counting-room is often too clearly discernible in the body of the paper, and that the editorial and business departments, instead of being absolutely independent of each other, are very emphatically the reverse.

The recent controversy anent continuous *versus* high-tension currents is a case in point. Mr. Edison promulgated some of the most extraordinary and unwarranted statements in his anxiety to advertise his own system, but editorial comments in the technical journals on his utterances were couched in such honeyed phrases that an "Edison censor" could not but have passed them. The cloven hoof of the counting-house is felt, if not seen here. The full-page advertisements of Edison concerns frowned down upon the editorial columns and extinguished any spark of independent criticism which might have attempted to shine out there.

It is our purpose to devote a great deal of attention to current electrical matters as kindred to the rubber industry; and our readers may be assured that whatever comment they find in our pages will always be unbiassed, totally free from any counting-room or business influence. We shall also be as careful to speak just as fully and fearlessly of the failures and shortenings of the various companies, as we do of their merits and accomplishments.

What they Say of Us.

From J. H. Kohmescher & Co., Cincinnati, O.

We desire to state that we are well pleased with your paper, and we hope all the rubber manufacturers, if they have any new goods to sell, will avail themselves of your "New Goods in the Market" columns, to publish same. Your November issue assisted us in adding four new novelties to our already large assortment of goods. We certainly wish you success in your enterprise.

From the American Rubber Co., Boston.

We think your idea of mentioning new and improved goods as they come out an excellent one.

From James Boyd & Bro., Philadelphia.

In sending our subscription, we wish to express our appreciation of your attractive and interesting journal, and trust that it will meet with great success, which it certainly merits.

From the Omaha Rubber Co., Omaha, Neb.

Your edition of November 15th is at hand and read, and we are very much pleased to see that it is fully equal in every respect to your original sample copy. We are glad we subscribed for the paper, and believe it will prove to be a very good periodical for the rubber trade. Wishing you all success, we remain, etc.

From the Woodhouse Mfg. Co., Railroad and Fire Dept. Supplies, New York.

Please send us THE INDIA RUBBER WORLD for one year. Though not embracing the leading line of our business, we think it a valuable paper to have.

From Benj. R. Western, Manufacturers' Advertising Bureau, N. Y.

I take this my first opportunity to congratulate you upon the vigorous appearance of your new venture, and trust it may live to see a good old age and do much good in its chosen field, which is one of the most important industries in the world, and has for some time needed a champion in the field of technical journalism.

From the Mason Regulator Co., Boston.

We have had excellent results from your paper as an advertising medium. The inquiries from rubber companies come in a way that shows the paper is read extensively.

From the Goodyear Rubber Co., St. Louis, Mo.

Have just seen a copy of your new journal, THE INDIA RUBBER WORLD. It is a good thing—just what has been needed. Hope you will meet with thorough, lasting success in every respect. Enclosed find amount for one year's subscription.

From Simpson & Beers, New York.

We are much pleased with the style and varied contents of your paper; also with the valuable information it gives. Our large and growing rubber industries should be represented by just such an attractive and enterprising paper. We have no doubt it will be fully appreciated. You have our best wishes for permanent success.

From the Electrical Review, London.

THE INDIA RUBBER WORLD AND ELECTRICAL TRADES REVIEW is the title of a new journal published in New York; and, judging from the excellently arranged first number, which has just reached us, there is a wide field before it. One little extract from the editorial announcement serves to point a moral and adorn a tale: "Upon one point we are anxious that there should be no misunderstanding whatsoever: the reading and editorial pages of this paper are not for sale." We notice that Mr. Herbert Laws Webb contributes the first portion of an article on "Insulated Wire."

From E. R. Rand, Manager Newton Rubber Co., Boston.

I think you have a very excellent paper. It is one the trade will appreciate, and I think it exactly the kind of a publication that will pay manufacturers to distribute generally among their customers. Its novelty will attract the attention of parties outside the manufacturing or general rubber trade, and for this reason it will be a good advertising medium.

From the Dubuque Rubber and Belting Co., Dubuque, Iowa.

Please send us THE INDIA RUBBER WORLD for one year from date. We think it a good paper, one from which a great deal of valuable information as regards rubber goods can be obtained, thereby "filling a long-felt want."

From James Bennett Forsyth, Esq., Boston.

I am very much pleased with your paper, and have great faith in it. I have taken pains to secure many sample copies, and have sent them round to my friends who are interested in rubber matters, and have received from them letters speaking very highly of it. I want to say that I believe in it thoroughly.

From the Electrician, London, England.

THE INDIA RUBBER WORLD AND ELECTRICAL TRADES REVIEW—This is the title of the latest American addition to the ranks of the technical journals. The first number of THE INDIA RUBBER WORLD is a distinctly good one, containing, as it does, more than twenty pages of very readable reading-matter. We note in the customary editorial proclamation on the first page the satisfactory announcement that THE INDIA RUBBER WORLD intends to devote its special attention "to that important branch of electrical development which has been most neglected and most needs improvement, namely: the intelligent and progressive *mechanical* adaptation of electricity."

From A. P. Cochrane, Esq., Revere Rubber Co., Pittsburg, Pa.

I like the paper. Success to it and all concerned in it.

From the Stoughton Rubber Co., Boston.

We are very much pleased. The paper contains much that is of interest to the rubber trade, and we believe that if you will continue making it as interesting in future as it has been in the first two issues, it will be a grand success. You have our best wishes.

From the Boston Belting Co., Boston.

We were very much pleased with the October number, and are pleased to note that the November issue is an improvement and enlargment on the October number. We hope that the good work as begun will continue, and think that your magazine will fill a long-felt want in the rubber trade. Wishing you success, we are, etc.

From Mr. W. M. Hill, President Standard Rubber Co., Boston.

Your paper is already showing us its worth as a medium of information to the trade, and we trust you will merit the success you deserve.

From Mr. A. Spadone, President Gutta Percha and Rubber M'f'g Co., New York.

I like your paper very much, and enjoy reading it, because it contains interesting and valuable information. It is just what is needed, and it compares favorably with any of the trade papers. We take the extra copy for our superintendent.

—The following additional subscriptions to the Guarantee Fund of the World's Fair have been reported since our last issue: Goodyear Rubber Company, $1,000; India Rubber Comb Company, $1,000; Samuel C. Watts, $500.

A Medal of Fifty Years Ago.

IN these days of large accomplishments and rushing business, medals awarded for merit at current exhibitions do not count for much in the estimation of either manufacturers or consumers, for their distribution is wholesale, like almost everything else. But in old times things were different. Then a manufacturer won his medal upon merit alone, and in open and fair competition with all comers. For these reasons it affords us special pleasure to reproduce in these columns the two faces of a medal which tells its own story.

By this we know that half a century ago the founder of what is to-day the Hodgman Rubber Company, New York, made rubber goods that challenged the competition of every rival, and that builded, sure and strong, the foundations of a business which ranks among the largest in the United States.

The original, which these engravings represent, is a solid silver medal, very handsomely executed, and in a state of perfect preservation. Stored away with it in the safe of the Hodgman Company is a most interesting collection of data pertaining to the business of the house, even years before this medal was awarded. Among these is a circular advertising the products of the firm about the year 1835, which, in point of style and typographic appearance, is a curiosity. It was evidently something very fine in those days, but as compared with the artistic printing of to-day, it is humorous.

Speaking of the medal, Mr. George F. Hodgman, son of the founder, and head of the house to-day, said: "That medal comes pretty near telling the whole history of this firm. Merit has been the one object held in view from the start, and about the first lesson that I learned in business was that the quality of the goods counts far more than all else in building up and holding a business. We stick to the old standard in the manufacture of everything offered to the trade to-day, and every year that rolls over my head attests the wisdom of that policy. When goods bearing the 'Hodgman' brand are not up to the very highest standard, nobody wants to know it more than we do."

New Goods in the Market.

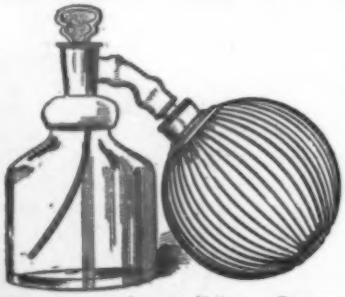
TO MANUFACTURERS:

It shall be our aim to embody in this department descriptions and illustrations of all the latest novelties introduced in the market; to the end that jobbers, retailers and rubber goods buyers generally may look here for information as to every thing new that each month or season brings forth. Manufacturers are, therefore, most cordially invited to co-operate with us in making the department as complete and attractive as possible—the distinct understanding being that no charge whatsoever, either direct or indirect, will be made for these publications. Our reward will come through giving our readers valuable information; and that will be reward enough if manufacturers but co-operate with us in giving the information freely and in all cases at the earliest practicable moment.

In forwarding descriptions of new goods, be careful to write on one side of the paper only; be as brief as possible, but always write enough to give the buyer a clear idea of the article you offer; quote prices if practicable; give your full address, plainly written; and in all cases send a small illustration or wood cut if you have one.

—We illustrate herewith the heel plate machine of the Hartford Specialty M'f'g. Co., of Hartford, Conn., to which they have just added a new attachment, whereby plates can be fastened to either rubber or leather heels as may be desired. The plate is placed in the clamp of the machine, over the heel, and by a single motion of the lever it is securely fastened. This machine has made an excellent record in both the character and quantity of its work.

—Hose makers and other mechanical goods men will rejoice that F. W. Devoe & Co., of New York, have listened to their plaints and produced a green that will stand 400 degrees of heat and is low priced. If the lawns next season are ever so parched there will be streaks of green across them.



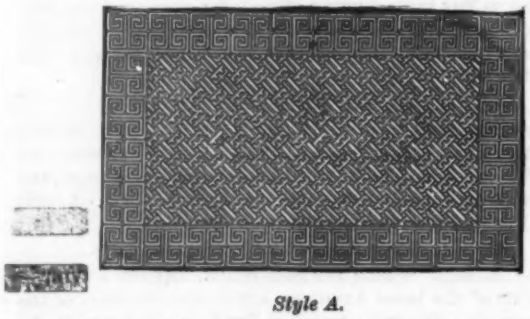
—The Tyeran No. 4 Tourists' Atomizer is manufactured by the Tyer Rubber Co., Andover, Mass. A special excellence of this atomizer is its stopper, which allows it to be closed so completely that it may be carried in the pocket, in a "grip," or in a trunk without danger of leaking. This may be a matter of economy as well as of convenience, as it prevents waste of fine perfume or expensive medicine. Put up in handsome leatherette box.

—Among the specialties for which the American Rubber Co., Boston, are finding increased demand, is a new light-weight silk garment for ladies, made with cemented seams, and thoroughly vulcanized after being made. Rubber dealers appreciate the advantage of having both garment and seams properly vulcanized. One obstacle in the way of large sales of these goods heretofore has been the weight as compared with a spread and sewed garment. Their fine silk Raglans, made as above, weigh from seventeen to eighteen ounces, and will wear for years. They are also finding liberal sales for their Sleeveless Macintosh Coat with long cape buttoning in front. This is a very sensible outside garment.

—The Improved Davidson Patent Nipple, which we here illustrate, is called the "Health," and is made of the best rubber obtainable. The enlarged rim or collar allows the neck to be bent without collapsing, it causes the milk to be forced out when pulled or contracted, and forms a guard to prevent the nipple being taken too far into the mouth to choke the infant. It can also be attached to any bottle where the common nipple is used, and will hold firmly. The child can almost entirely close its mouth when using it, thereby allowing a stronger hold and rendering it much easier to nurse from, as the fluid will be forced from it either by biting, pulling or sucking. It can be used without a tube, and as water can easily enter into all its parts, it can be kept clean and sweet. The box in which this nipple is packed is of a shape to especially accommodate the goods, and has been made the subject of a copyright by the Davidson Rubber Co.

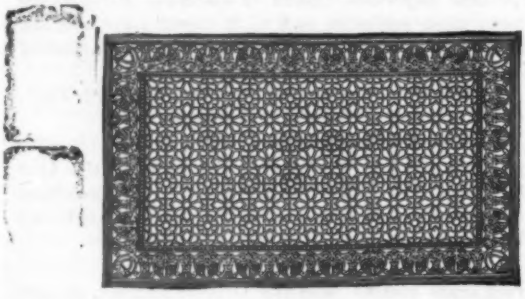
—The Stoughton Rubber Co. have recently added a full line of new machinery for the manufacture of rubber carriage drills and duck, which they are now producing.

—The engravings show styles A and B of a new rubber mat manufactured by the New York Belting and Packing Co., New York, called their "N. P. M." Embosed Solid Back Mat. These goods are very neat and attractive in appearance, and of a style never before



Style A.

manufactured. Though practically a new mat, they are similar to the company's regular goods, so far as regards the materials used in their manufacture, but dissimilar in that they are thinner, a characteristic which commends itself to the many who have been bothered by the interference of the ordinary threshold or door mat.



Style B.

Not being as high as the average threshold, the door can easily swing over it. The "N. P. M." mat is specially well adapted for vestibule and office use, and is in large demand.

—In a late circular issued to the retail drug trade, the Tyer Rubber Co., Andover, Mass., say of their Perforated Frictional Belts: If you will but make a trial you will find them fully as represented. We will give you testimonials of their great merit if you desire. Our aim has been to present a reliable belt at a reasonable price. Our hot water bottles are unsurpassed by any in the market, and at this time of the year when the demand for them is the greatest, care should be taken to get the best. We have this season made a specialty of these. We put each one in an attractive box so that they can be kept in stock without danger of becoming soiled. Each box is labeled with the size and our trade mark, "Tyrian." You will find both belts and water bottles, as well as the rest of our line of druggists' sundries at any of the wholesale druggists. We think it would well repay you to examine these goods when you visit your wholesaler, and we trust you can favor him with an order.

—We illustrate a new Deodorized Rubber Counter, which costs less than leather, and is not affected by heat or moisture. They do not chafe the heel or run over, and by a new process of deodorizing are sweet and clean smelling. They are warranted by the manufacturers, Messrs. Spinney, Virtue & Co., of Lynn, Mass., which means that every pair will be alike, and that the finish will be first-class.

—Herewith is an illustration of Mains' Rubber Operating Aprons, with receptacles or pockets for use during all surgical operations upon the head and face, and also in all gynecological cases. It is also especially adapted for use in operations upon the breast, arms and lower limbs, the receptacle receiving all discharges and wash water which may be used, preventing, in all face and head operations, all flowing down upon the patient, and preventing in all instances soiling of the clothing, sheets, floor, etc. For sale by Codman & Shurtleff, 13 Tremont street, Boston, Mass.

—The Hoyt Rubber Co., Boston, are making a tiny "Electric Washboard," in which strips of rubber are used for the face instead of zinc. It sells like hot cakes among the city dwellers who do a little of their own washing at home.

Bag detached.

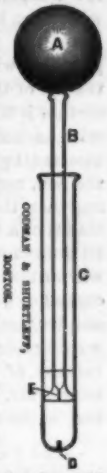
—The accompanying cuts illustrate the new fountain syringe lately introduced by the Atlas Rubber Co., New York. It will be observed that it comprises a fountain syringe, an intermittent stream syringe, and water bottle. The bag when detached from the syringe makes a very complete, light and durable hot water bottle. The instrument is packed in a handsome inlaid wood box, which gives it a very showy and attractive appearance, and wherever displayed it has sold readily.

The Water Bag ready for use.

—The Gutta Percha Co., of London, Eng., manufacturers of the Atlantic and a large proportion of other submarine cables, and by far the largest holders of raw gutta percha in the world, have commenced the manufacture of cheap tissue for tailor's trimmings, etc., and have appointed the Mineralized Rubber Co., of New York, their sole American agents for the same.

—An instance of the enterprise of the Colchester Rubber Co. is shown in their placing at the Milwaukee Fair a skilled boot and shoemaker, shipping the unvulcanized stock to him, and having the goods made up before the eyes of the admiring public.

—Wolpert's Air Tester, for testing the quality of the air in inhabited apartments, consists of a simple rubber bulb (A), of a capacity of twenty-eight cubic centimetres, a glass outlet-tube (B), with a constriction near its extremity (E). A glass test-tube (C) has a horizontal mark near the bottom, indicating the point to which it must be filled with perfectly clear lime water. The bottom of the tube is whitened, and has a black mark stamped upon it (D). A small wooden stand, a brush or swab, a vial of vinegar for cleaning the tube, and a bottle of clear lime water, completes the outfit. In order to use the instrument, the lime water (saturated solution) should be poured into the test-tube until it reaches the horizontal mark. Press down the bulb with the thumb, so as to expel the air within it as completely as possible, and allow it to fill with the air of the apartment; insert the small tube into the lime water nearly to the bottom, and again expel the air with moderate rapidity, so that the bubbles may rise nearly to the top of the tube, but do not overflow, taking care to continue the pressure of the thumb till the small tube is removed from the lime water. Repeat this process until the mark upon the bottom of the test-tube is obscured by the opacity produced by the reaction of the carbonic acid upon the lime water, the observer looking downwards through the lime water, from the top of the test-tube. For sale by Codman & Shurtleff, 13 Tremont street, Boston, Mass.

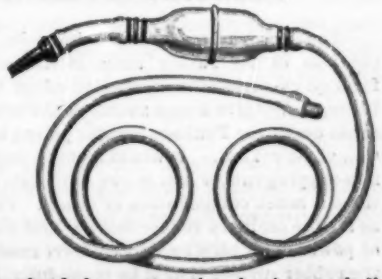


—We note that the Boston Rubber Shoe Co. are placing upon their boys' boots the neat seal of the company, which forms a very effective and pretty trade mark.

—An idea for a new line of goods for some American manufacturer, is to learn to make the pure gum strip that the insulated wire men are using on fine wires. The strip comes in a sticky form, and is wound round the wires, and although it is vulcanized, a little heating will fuse it into one solid mass. As far as we can learn, American manufacturers have not been able to equal the English in producing this line of goods.

—In many of the rubber shoe factories we notice samples of Chinese and Japanese rubber shoes, which is an encouraging symptom for the increase of the trade across the water.

—A new scheme of a well-known rubber man is the manufacturing of piano hammers of rubber, in place of the ordinary felt-covered hammers, which are continually giving out.



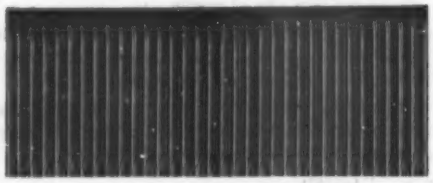
—The new "Queen City Syphon," manufactured by Messrs. J. H. Kohmescher & Co., Cincinnati, O., is here illustrated. The entire syphon is made of rubber; bulb and tubing soft rubber; tip, couplings and strainer of hard rubber. The tubing is five feet long and one-half inch inside diameter. It is very simple in construction, having no ball or pin valves, and cannot get out of order. Price within reach of all. On January 1 the firm will issue a new 150-page catalogue, illustrating, describing and quoting their entire line of goods. This will be forwarded to buyers on application.

—Messrs. Hohman & Maurer, of New York, whose announcement will be found in our advertising pages, are now offering some recently improved thermometers, which are specially adapted to service in rubber factories. Their instruments have been in use in some of the leading mills in our trade for some years past, and they

have made an enviable record. Correspondence with rubber manufacturers in relation to the improved instruments is invited.

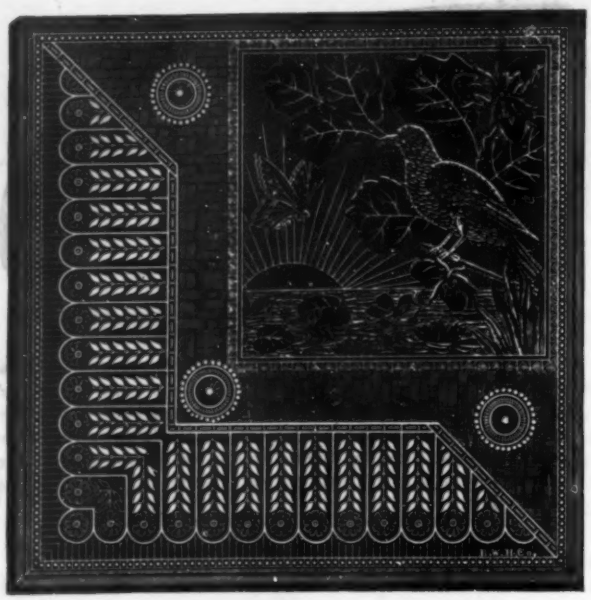
—The accompanying cut is an illustration of the Palmer Duplex Fountain Pen, the particular merit of which is that it has a double feed, both above and below the pen point. It is made of hard rubber and gold, which are impervious to ink acids. The hollow handle holds the ink, and into this operates a screw section, provided with a prolongation that overlaps the top of the slit of the pen to near the points. Into this screw section is fitted snug a feed bar, the latter provided with an ink duct of a double action, being two channels bisected by one vent, which operates under the slit of the pen, near the points. When the parts are placed together the top and bottom feeds are similar to the blades of a draughtsman's pen. Its strong points can be thus summarized: A natural-shaped pen, 14k. gold, warranted; various sizes of holder, hard rubber, plain, chased or gold-mounted; automatic supply of ink to top and bottom of pen at the point; allows natural handwriting, shaded or fine lines as required; permits natural use of pen dip, or write 5,000 words without dipping. Mr. Charles H. Kilborn, 3 Tremont Place, Boston, is the agent of the manufacturers.

—The American Rubber Co., Boston, are now making a rubber boot which is worthy of attention from the trade everywhere. It is known as the "Best Ever Made," the stock is of the very purest, and it is branded on both the bottom and the leg with a medallion which says: "This boot is made from old-fashioned pure rubber, best ever made," and beneath this is the company's name as a guarantee. The boot is also made with an extra long leg, the same length as the long knee boot, besides which it has an extra thick sole and tap. The manufacturers claim that it is without question the best boot in the market to-day. It is made in men's sizes only, and is sold to the retail trade at $36 per case, the retail price being, by contract, not less than $3.75 per pair.

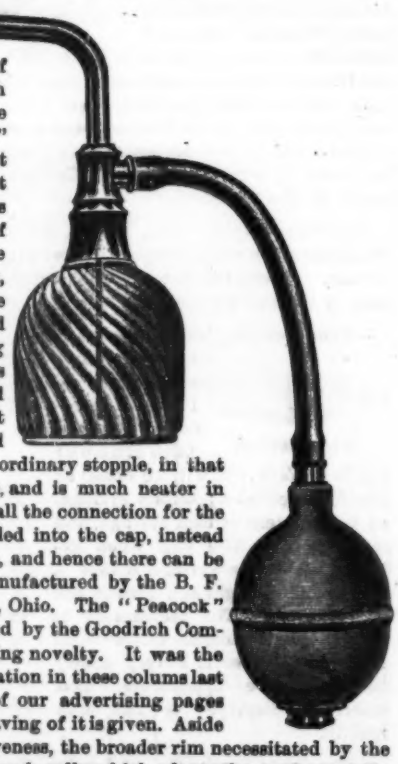


—The corrugation of rubber shoe soles and stair treads is a very old idea in the rubber trade in America, but it has remained for a quick-witted Frenchman to adapt the same idea to rubber belting. We give here a sketch of the new fluted belting now being made under the Poullain-Beurier patent by the Mineralized Rubber Co., of New York. It would seem to meet an obvious want for a non-slipping rubber belt to run outdoors, or in wet places, or where there is much condensation of steam. The price is about the same as for the ordinary rubber belting, and the patentee claims a gain of power in all belts by its use. Over small pulleys the elastic grip of the rubber surface should be more fully developed by the flutings. It is especially adapted to saw-mill work.

—The fine lines of Double and Single Texture Coats shown by the Standard Rubber Co., Boston, are meeting with much favor, and it is with difficulty and an increased force of help that they will be able to complete their holiday orders promptly. The handsome three cape Newmarket, popularly known as the "Oolah Garment," made by the same company in silk, and single and double texture tweed and all-wool cloths, is a notable success this season. All the leading dealers speak highly of its large sale. It is expensive, and designed only for fine trade.



—We have often spoken of "Art Goods in Rubber," but it is rarely that we get a chance to show such work as the above. The design is for a cuspador mat, and is one of the new and original masterpieces of the Boston Woven Hose Co., Boston, Mass.



—The good points of this atomizer, which bears the suggestive name of the "Summit," are such that it will at once commend itself not alone as a novelty but as an advance in goods of this kind. Bulb and tube are of the best quality, and the metal fittings are perfect in stitch and finish. The atomizing tube of hard rubber is made so as to withstand hard usage and constant handling. The threaded cap is far ahead of the ordinary stopple, in that it cannot become loose, and is much neater in appearance; and last of all the connection for the soft rubber tube is moulded into the cap, instead of being a separate piece, and hence there can be no leak there. It is manufactured by the B. F. Goodrich Co., of Akron, Ohio. The "Peacock" Comb, also manufactured by the Goodrich Company, proves to be a taking novelty. It was the subject of a small illustration in these columns last issue, and on folio xi of our advertising pages this month a large engraving of it is given. Aside from its artistic attractiveness, the broader rim necessitated by the "Peacock" forms a strong handle which adapts the comb specially to the use of ladies who have long and heavy suits of hair.

—Some of the varnish manufacturers are said to be experimenting with india rubber to get a new varnish. The time will come, no doubt, when the deposits of copal and kauri will give out, but it is doubtful if ever rubber can be made to take their place.

Insulated Wires.

III.—Gutta Percha.

BY HERBERT LAWS WEBB.

THE standard material for the insulation of submarine and underground wires is gutta percha, and were it not that the demand is so much greater than the supply, this excellent dielectric would be used to a much greater extent than it is. A good many years ago, before the applications of electricity had multiplied to such a bewildering extent, gutta percha was gutta percha. To-day it consists of a variety of foreign substances containing slight traces of the original gum. In the early days of telegraphy a great many failures occurred with underground and submarine lines owing to the insulation breaking down after a few month's work. These failures, however, were generally traceable to causes distinct from any inherent defect of the gutta percha itself. In some cases the material had not been properly cleansed and purified; in others the processes of manufacture had been faulty. Again, even when all care had been taken in the preparation of the raw material and in the manufacture of the covered wires, insufficient care was taken with the cables and wires in storing, transporting and laying down. Some underground wires were laid in England in earthenware pipes, and it was found that the roots of trees spreading out broke up the pipes and soon destroyed the gutta percha. It was also the custom, while laying the wires, to pass them through a cistern of molten pitch and then through a deposit of sand, in order to administer a preservative coating to the gutta percha. Sometimes the paying out of the wire was stopped, and the gutta percha on the part within the cistern was soon melted off, the wire passing into the pipes covered with pitch and sand only. Naturally the insulation of that wire soon gave out. However, as time rolled on, manufacturers and engineers became better acquainted with the material they had to deal with; the various stages of manufacture were rapidly improved, and, it may be said perfected; various excellent processes were invented, and greater care and more searching supervision were exercised, especially directed to the elimination of "factory faults." When the wire emerged from the factory, the utmost caution came to be used in the storing and manipulation of it, and in securing adequate protection from mechanical injury. As a result gutta percha has fulfilled the most sanguine expectations which it aroused on its original introduction as a dielectric, but its field is limited to submarine and underground work where it can be kept cool and damp. In such situations, when properly protected from mechanical injury, gutta percha is extremely durable, and it would be difficult to fix any limit to its useful life.

Many cables laid down thirty years ago and used steadily are still working well, and when repairs are made the gutta percha is found to be practically as good as when new. Lately portions of underground lines put down in England as far back as the forties, have been recovered and the gutta percha was tested, and exhibited no signs of deterioration. In those days, however, as I hinted before, gutta percha was what it pretended to be; to-day the pure article commands such a high price that it is adulterated to a very large extent. The market is crowded with a variety of inferior gums, while the genuine article is obtained in large quantities only with the greatest difficulty. Even ten years ago, an examination of the Amsterdam market revealed the fact that there were over fifteen different samples of gutta percha, varying in value from $50 to about $500 per ton, and that no sample that could be bought by wire-coverers, except those who were engaged very largely in the trade, could be obtained that was not a mixture of some five or six of them; some being, of course, of a very inferior quality. This adulteration of a material that is so largely used, severely handicaps the electrical engineer in carrying out his work, and, no doubt, many troubles and failures may be set down to this cause.

For out-door work, or in fact for any situation where it is exposed to atmospheric changes, heat and the action of gases, gutta percha is ill adapted. In dry places it becomes hard and brittle, and soon cracks and deteriorates. One of the great difficulties met with in underground work was to efficiently protect the gutta percha from contact with organic matter, as it was found that the insulation was soon destroyed when the wires were exposed to the action of sewerage, decaying vegetable matter and similar substances. Freedom from currents of air was also found necessary to secure the durability of the gutta percha, and great precautions had to be adopted to provide safeguards against all these causes of deterioration, in the shape of tarred jute and hemp outer covering and hermetically sealed conduits.

Before gutta percha and copper wire emerge from the factory in the finished state as submarine cable core, underground electric light, telegraph or telephone wire, they travel together through a considerable amount of machinery, and are subjected to rigorous and searching tests, both electrical and mechanical. First the rough lumps of raw gutta percha are thrown into a tank of warm water where they are kept until the heat makes them plastic and a great part of the dirt is washed out. Next they are worked up into a sticky mass in machines called "masticators." These consist of heavy cast-iron cylindrical casing, in which revolves a grooved roller, steam heat being applied to keep the material plastic. This process is carried on for a certain time, depending on the judgment of the foreman, who, on observing that the substance has assumed a certain color, has the plastic lump removed to a hydraulic press by which it is forced through an extremely fine steel wire sieve, any impurities which may have escaped the previous cleansing processes, being retained by the mesh. These sieves are fifteen inches in diameter, on which area a total pressure of 118 tons is brought to bear. The cylinders of the presses, as in the case of the other machinery, are steam jacketted, care being taken throughout to prevent the material from cooling. The purification of the gutta percha is now complete. Now comes the process of covering the wire. The gutta percha is first re-worked in masticators and brought to a proper consistency. In this operation a good deal of the success depends on the operators, or perhaps more particularly on the foreman who has charge of mixing the various kinds of gum, and the amount of treatment to be given according to the nature of the work, and the insulation required. Experience, however, is his surest guide, and he seldom makes a mistake.

The core-making machines are fine specimens of ingenuity and accuracy. The copper conductor is wound on bobbins and placed on a frame at the back of the machine. It is first drawn through a tank of Chatterton's compound, which serves to make the gutta percha take evenly on the wire and adhere to it thoroughly. If a stranded conductor is used, the center wire is first coated with Chatterton and the others twisted around it; by this means all the interstices are filled up and the air is excluded. The core-making machine consists of a steam-jacketted cylinder into which the gutta percha is fed by means of a pair of rollers placed with their axes in the same horizontal plane; as the rollers revolve the material is forced down between them, all air being squeezed out, one great object being the entire exclusion of air bubbles. The mass of gutta percha is forced down into the cylindrical receiver, at the outer end of which there is a die cylinder; in the receiver revolves a worm working on a shaft, which continually presses the gutta percha forward until it enters the die-cylinder. The wire is drawn through the hole in the die, and takes with it a coating of gutta percha, which, being under pressure and in a plastic condition, adheres readily to the wire. After emerging from the machine the core is hardened by being passed through long tanks filled with water kept at a temperature of 40 degrees Fahrenheit. The core is afterwards all examined by an expert, through whose hands it is quickly run, and any flaw or imperfection he discovers is remedied by tooling the gutta percha with a hot iron. Constant practice enables the examiner to detect by touch the smallest imperfections. For some qualities of insulated wire, such as submarine cable core and other high-class work, two or three coatings of gutta percha are applied, and the operations described above are repeated several times.

The completed core is stored in tanks containing water kept at a temperature of seventy-five degrees Fahrenheit, and subjected to the most searching electrical tests, by means of which even the minutest defects are discovered. When intended for use on electric light circuits the insulation is also tested with currents of very high pressure.

As I stated in a previous article, by far the greater proportion of the submarine cables of the world are insulated with gutta percha, and gutta percha is used exclusively by manufacturers of submarine cables to-day, and no doubt will continue to be used until the supply gives out, which it is fervently to be hoped, it never will. Gutta percha is used exclusively by the British Post Office department in its extensive underground system. As the chief electrician of that department stated not long ago, in spite of adulteration and occasional mishaps from that cause, they stick to gutta percha. They have used gutta percha for forty years, and they know its life and its peculiarities; what it can do, and what to do with it. They have tried everything else that has been brought to the front. They tried india rubber, and it failed. India rubber is admirably adapted; it is the only material, in fact, for indoor purposes; but when you come to underground and submarine cables, then india rubber utterly fails, and gutta percha has been successful.

In England they also use gutta percha for telephone cables; in this country it is not used at all for that purpose, except for crossing rivers. Gutta percha possesses one quality, which, while it is a serious obstacle to the telegraph engineer, absolutely prohibits its use to the telephone man where the cable is to be of any length. I refer, of course, to its high inductive capacity, which is rather more than double that of cotton insulation treated with paraffin or resinous oil. That is to say that one mile of gutta percha insulated cable retards telephonic transmission to as great an extent as would two miles of cable insulated with cotton and paraffin or cotton and oil.

At some future date I shall have something to say about telephone cables, so that I need not enlarge on this point now, but it is quite evident that, invaluable as gutta percha is to the telegraph fraternity, telephone engineers want to have as little to do with it as possible.

Is White Zinc Rubber Poisonous?

APROPOS to the statement that white zinc rubber is poisonous, and that it should never be used in teething rings, nipples, or goods that come in contact with saliva, we append a few words from two eminent chemists, that are the result of investigations made by the Davidson Rubber Co.:

GENTLEMEN—I have examined the white rubber nipples received from you, and am satisfied that they are entirely harmless when taken into the mouth. These nipples do not contain lead in any form, and it is impossible to extract any injurious substances from them by saliva. Respectfully,

S. DANA HAYES,
State Assayer of Mass.

HARVARD MED. COL. CHEMICAL LABORATORY.

DAVIDSON RUBBER CO., BOSTON, MASS.:

GENTLEMEN—I have carefully tested the rubber nipples (black and white) received from you, and find them to be harmless. They may be taken into the mouth with perfect safety, and cannot impart any injurious substances to the saliva.

Respectfully yours, EDWARD S. WOOD, M. D.,
Professor of Chemistry.

Referring to the same subject, Mr. Henry A. Reed, manager of the Bishop Gutta Percha Co., New York, writes us: "It may be well to note that gutta percha may be used for most of the purposes named, and being made from pure gum without oxides or other adulterants, and the best-known resistant to the action of acids, is much better than rubber for such uses."

—About a year ago the Mattson Rubber Co., of New York, made a line of "rubber dam" by a new process, in which every trace of the vulcanizing agent was removed. A five-pound package of this gum was sold to a dentist, who, not having immediate use for it, allowed it to lie for six months in a closet before examining it. At the end of this time, with the feeling that like all dam it must be spoiled, he took it up to throw it into the waste basket, when to his surprise he found that it was in as good a condition as when he first got it. It is needless to say that since then he has used no other rubber dam than that made by this company, and is only one of many customers who are so pleased with the new goods that they are pursuing the same tactics.

—In our November number, the printer made the name Chelsea Wire Fabric Rubber Co. read Chelsea Bone Fabric Rubber Co., and had not the members of this corporation been gentlemen of singularly good nature, we fear they would have a bone to pick with us. As it was, however, they simply remarked that the singularity of the name proved simply an extra advertisement for them, as any one at all familiar with rubber goods must be aware that there was no such thing as bone fabric, and also that the coming belting and hose was that in which threads of wire were woven through the duck.

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ANNALS
—OF—
India Rubber, Gutta Percha, Celluloid and Asbestos.

India Rubber Caoutchouc or Gum Elastic [called *cachuchu, cahuchu*, by the South American Indians; German, *kautschuk, fedérharz;* French, *caoutchouc, gomme élastique*] the concrete milky juice of numerous trees and plants growing throughout the tropical regions.

Gutta Percha [called in all languages by that name which is of Malayan origin; *gutta* signifying gum, and *percha* the tree from which it is obtained] the concrete milky juice of trees belonging to the family of Sapotacæ, found in the Malayan forests and islands of the Eastern Archipelago.

Celluloid, a product of recent invention, obtained by dissolving *pyroxylin* or *gun cotton* in camphor or other solvents with the aid of heat and hydraulic pressure.

Asbestos, Amianthus [Greek, *asbestos*, inextinguishable, and *amiantos*, undefiled; Latin, *amianthus asbestinum;* French, *amianthe;* German, *asbert*] a fibrous mineral found mainly in veins in the serpentine and other primary formations throughout the entire world.

(*Continued from page 30.*)

1823.—HANCOCK (Thomas) obtains in England his second patent, March 22d. This is "for an improvement in the preparation, for various useful purposes, of pitch and of tar, separately or in union, by an admixture of other ingredients with either or both of them." Mr. Hancock's claims to compounds of rubber, pitch and asphalt are embraced in his patent of November 21st, 1843.

1824.—HANCOCK (Thomas) obtains his third English patent, November 29th. This is "for improvements in the method of making or manufacturing an article which may be, in many instances, substituted for leather, and be applied to various other useful purposes."

During the previous month of May, Hancock had received from Central America a considerable quantity of the caoutchouc juice, as drawn from the trees. The liquid was of the consistence and color of thick cream, and, when exposed to the open air in the sun, or in a warm room, became inspissated, forming a substance exactly resembling crude india rubber. Hancock's process was merely to take this liquid in its natural state and to saturate with it either felt, carded cotton, wool or hair, in combination with other fibrous sub stances, such as hemp and flax, and to subject the whole to pressure.

1824.—FLEETWOOD (Charles Bagenall) is granted an English patent for a waterproofing liquid and composition made by dissolving ten pounds caoutchouc in twenty gallons of pure spirits of turpentine, the vessel containing which is immersed into a boiler filled with cold water which is afterwards brought slowly to a boiling point.

1824.—WEISE (William Philip) obtains an English patent for a waterproofing solution made of equal parts shellac, caoutchouc, gum mastic, gum animi and gum sandarac, "dissolved in spirits of wine or turpentine, or any other spirit, to the consistence of water."

1825.—LEESON (H. B.) reads a paper before the Nottingham Literary and Scientific Society, detailing his method of manufacturing tubes and other similar articles of caoutchouc. This consisted in softening and distending the crude material to an uniform thickness, cutting from it strips and wrapping the latter spirally around polished rods of the required diameter. After the strip was wrapped, it was covered and held down in its place either by a tape or by a metallic band, its entire length, and the rod thus covered was plunged into warm water, gradually brought to the boiling point. In a short time perfect adhesion of the india rubber edges took place, and the tubes thus formed were easily pulled off the polished rods.

1825.—HANCOCK (Thomas) is granted two English patents under date March 15th. One is a for a new method of manufacturing artificial leather by employing a solution of india rubber instead of the liquid of the former patent, the other being for the employment of the liquid rubber as a coating for "ropes or cordage, and other articles from hemp, flax and other fibrous substances, with the view of rendering them waterproof."

1825.—The first lot of india rubber shoes made of pure gum ever imported from Para was sold in Boston, Mass., by Thomas C. Wales. The shoes were of very peculiar shape, but Mr. Wales improved upon the style of subsequent shipments by sending American lasts to the Brazilian natives.

1826.—LACY (Henry Charles) is the first to take an English patent, November 18th, for carriage springs made of "cubical blocks of caoutchouc," having partition plates of iron between each series.

1826.—In the second volume of "The Operative Mechanic," published in Philadelphia, will be found, at page 299, the first detailed account of heating rubber in moulds.

1826.—RATTIER and GUIBAL introduce, at their Saint Denis factory, machinery for cutting threads of india rubber to be used in the manufacture of elastic fabrics, and subsequently are granted patents for the same, as well as for other improvements, in France and in England.

1826.—HANCOCK (Thomas) enters, during the month of February, into a working agreement with Messrs. Macintosh & Co. concerning their respective patents. A new factory was built at Manchester for the manufacture of waterproof clothing, and the latter soon began to be made there upon a very extensive scale, since it was found that the tailors would not or could not make up garments in a suitable manner out of the prepared cloth. It was at this factory that Messrs. Hancock & Macintosh made for Captain John Franklin (knighted in 1827) many life preservers, boat coverings and other waterproof articles used by him during one of his Arctic explorations.

1826.—HANCOCK (Thomas) manufactures, in May, caoutchouc gas bags for experimental purposes, and, later, at the suggestion of Lieut. Drummond, they were used in the Trigonometrical Survey with the oxy-hydrogen jets on balls of lime. Speaking of these bags in his subsequent book, Mr. Hancock says that they "were made of very strong materials, not only to enable them to sustain the internal pressure of the

gas, but also the rough usage they were likely to be exposed to in such service. The air-proof lining was of thin cut sheet rubber, and the exterior of fustian. I had the curiosity at the time to make a bag of this material, which I filled with water and sealed hermetically. I did this for the purpose of discovering whether rubber is or is not absolutely impervious to water. I suspected it was not. The bag is now before me, and I will copy from the record written upon it of its original weight when filled and the periodical decrease of the water contained:

	LBS.	OZ.	DR.
October 21, 1826	1	1	4
October 25, 1827	1	1	2
October 2, 1835	1	0	0
November, 1844	0	14	12
October, 1849	0	13	4
February, 1851	0	7	8
May, 1854	0	3	14

"I have just now, 1856, cut it open; it is quite dry, and weighs three ounces twelve drachms, proving that rubber is not absolutely impermeable to water, but admits of a slow and gradual absorption of moisture through its substance; and in this case the whole of the contents of the bag escaped, or rather more than twelve ounces, in the long course of twenty-five years!"

1827.—The first known india rubber hose is manufactured by C. Macintosh & Co., at Manchester, and is alluded to by William Baddeley, Jr., in *The Mechanics' Magazine* as having been successfully employed during the large conflagration at Fresh Wharf, in London.

1828.—Howe (John J.) obtains a United States patent for a composition of matter to be used as a flexible waterproof and air-proof solution, paint or varnish.

1828.—Hancock (Thomas) enters into a working arrangement with Messrs. Rattier & Guibal to manufacture abroad whatever may be deemed necessary, and takes over with him to France Messrs. Christopher Nickells and Edward Woodcock, Jr., as well as all needed machinery products and workmen, for developing the new industry.

1828.—Comstock, a physician of Hartford, Conn., makes known a process for dissolving caoutchouc in turpentine so as to make it plastic and adapt it to being spread upon cloth.

1829.—Howe (John J.), of the city of New York, is granted another United States patent for "the combination of india rubber with any of the resins that are soluble in oil of turpentine, or other volatile oil, by means of such of said oils as are known to be capable of dissolving india rubber and the respective resins made use of, so as to form either a paint, varnish or cement that will render porous bodies impermeable by either water or air; and the application of said invention in the improvement in the arts of painting, varnishing and cementing."

1830.—Davis (Charles) describes in the Franklin *Journal*, Vol. V., page 123, the process for combining india rubber with stockinet, as well as a description of goods and the method of making them.

1830.—Hancock (Thomas) sends an agent to Brazil for the purpose of instructing the natives as to the best mode of collecting and of preserving the caoutchouc juice.

1830.—Hancock (Thomas) takes out his sixth English patent, on the 5th of August, for the application of the pure liquid caoutchouc, as taken from the trees, to the manufacture of "certain articles of dress or wearing apparel, fancy ornaments and figures." The claim embraced the combination of the "liquid caoutchouc with fibrous and other matters . . . . and the application of the coloured composition or varnish to the various purposes" described. The combination was given as 10 lbs. liquid caoutchouc, 10 oz. whiting, 10 oz. Oxford ochre, and 10 oz. hair, wool, cotton or other similar fibrous substance; the coloring matter being lamp black, chrome yellow, blue verditer, or Venetian red.

1831.—Richards (George H.), of Washington, D. C., receives, April 11th, United States patent "for a mode of rendering a variety of articles waterproof by means of fluid caoutchouc, and of otherwise using that substance," as printed page 131, Vol. VIII., of the Franklin *Journal*.

1831.—Some Vienna manufacturers introduce compound cotton and worsted threads having a center of caoutchouc, which novelty is shortly after introduced in England and in France. Both the Leicester and Nottingham workmen soon improve upon the Austrian method, and make gloves with caoutchouc knitted at the wrist, as well as stockings having caoutchouc attached at the top to serve in lieu of garters.

1832.—Lüdersdorf, of Berlin, finds that when caoutchouc is mixed with sulphur it loses its adhesiveness.

1832.—Webster (Wait), of New York, receives, May 19th, a United States patent for attaching soles to gum elastic boots and shoes.

1832.—Dumeste (Julien Frédéric Maillard) is given, on the 7th of December, an English patent for the first rubber thread machine, "to reduce caoutchouc or india rubber into elastic thread, calibered of different sizes."

1833.—Braconnet gives, in the *Annales de Chimie*, an account of a new substance which he names *xyloidine*, and describes it as being white, pulverulent, neutral and very inflammable.

1833.—Charter obtained for "The Roxbury India Rubber Factory," at Roxbury, Mass., the first company organized in the United States for the manufacture of india rubber into waterproof clothing, etc. The charter reads as follows:

"Be it enacted . . . . that Lemuel Blake, Luke Baldwin, Edwin M. Chaffee and Charles Davis, Jr., ... be, and they are, created a body corporate, by the name of the Roxbury India Rubber Factory, for the purposes of manufacturing, at Roxbury, in the county of Norfolk, india rubber cloth and leather and other india rubber goods . . . . approved February 11, 1833."

Previous to organizing the above-named company, John Haskins, E. M. Chaffee and Luke Baldwin had long been experimenting at covering cloth with caoutchouc, in a small building on Dudley street, Roxbury, and with a spreading machine of Chaffee's invention.

The new company was started with a capital of $30,000, which was afterwards increased to $240,000 in 1834, and to $300,000 the year following. Besides clothing, it manufactured shoes, life preservers, coats, carriage traces, etc. During the year 1836, the company made, for the United States Government, the first pontoons constructed of unvulcanized rubber, as well as machine belting, and, in 1837, they manu-

factured a large number of umbrellas out of muslin coated with india rubber; but, as Mr. Goodyear says, "owing to the adhesiveness and decomposition of the unvulcanized gum, the manufacture had to be abandoned."

During the years 1833 and 1834, Mr. Chaffee had been granted United States patents for making india rubber hose and mail bags, as well as for improvements in the manufacture of boots and shoes.

The company failed, 1839–40, but its title was continued until 1844, when it was changed to that of "The Goodyear Manufacturing Company," and, in 1845, the business was incorporated under the name of "The Boston Belting Company," which it yet bears at the time of writing, the factories being still located in Roxbury, now a part of Boston.

It may be well here to note that Mr. E. M. Chaffee, in his sworn statement of August 15th, 1850, attributes the cause of the failure of the Roxbury Factory, as well as of the other rubber companies then operating in and about Boston, to "a want of knowledge of the method of curing india rubber so as to be impervious, or insensible, to cold or heat, and so as to resist the effect of the essential oils and animal perspiration. The knowledge of the art of thus curing and preparing india rubber was obtained by Charles Goodyear, who invented it some years later."

(*To be continued.*)

Rubber Tubing.

I.

ALL of the manufacturers of "Druggists' Sundries," and most of the makers of mechanical rubber goods produce rubber tubing. It comes in a variety of forms, sizes and compounds, to suit an almost infinite diversity of requirements, and like all goods of rubber, may be excellent, fair or good for nothing. Most of the tubing which is purely rubber, that is, that has no "cloth insertion" or wire "reinforcement" nor tin-foil inner walls, is made on the tubing machine, in other words, is "squirted." There are, however, a few manufacturers who still make it in the old-fashioned way and take pride in advertising the fact that their tubing is "hand-made." Regarding the minute details of the hand-making processes there are some slight differences in various mills, yet on the whole nearly the same methods are followed in each. The following is a brief description of the process as it is in vogue, where the tubing-machine has not yet been adopted.

The stock for the tubing, or the "mixed sheet," is spread quite thin on cotton sheeting, in a roll of some fifty yards in length, which, as fast as spread, is wound upon a wooden core. The table upon which the tubing is to be made is zinc-covered and should be very smooth. The roll of sheet rubber is hung in a "rack" consisting of two simple uprights, with bearings for a horizontal bar which runs through the core. The "cutter" or foreman of the gang, takes a clean-squared stick, a trifle longer than the sheet is wide, and, slipping it under the edge, acquires a firm hold. One of his assistants winds the cotton sheeting off upon a second core while the "cutter," still holding the rubber, backs slowly the length of the table, taking care not to stretch the long sheet which follows him. Letting it drop upon the zinc, he wets his knife and cuts the sheet away from the roll, leaving it a little more than fifteen feet in length.

The tube-makers now gather in their places, all on the same side of the table, the "cutter" standing farthest from the roll. The further edge of the rubber sheet is secured to prevent slipping, by running a small brush, wet with naphtha, under the edge of the sheet, or by striking with the palm of the hand the whole length of the edge; or, better still, by having a long strip of board hinged to the table, on the under side of which is a corrugated strip of vulcanized rubber, and on the upper side a few leaden weights.

The mandrels, or wires, which are to form the core of the tubes, are laid upon a table at the back of the workers. The wires have previously been treated to either a thorough coating of grease or of soft soap, and dried, after which a light coating of cement, made of mixed sheet and some convenient solvent—naphtha is the most common—is brushed over the length of the wire. (Some use no cement at all, folding the rubber over upon itself.) In a few moments this is dry. A wire is then laid upon the edge of the sheet, which has previously been "trimmed" by the "cutter." The four tube makers strike it gently to "set" the cement, and then turning up the wire slightly, the edge is stuck, wherever not previously caught by the "setting." The wire is then raised free from the table, the sheet straightened out, and the core rolled over upon itself three or four times, gauges in the hands of the workers determining its size. The "cutter" then wetting his blade anew, goes to the further end of the table and walking backwards, by a single long-skillful stroke, cuts the tube free from the sheet. After being rolled forward and back several times, and possible blisters being pricked, the tube is taken by the "end man," swung over the heads of the "middle men," and deposited upon the rear table, which is upholstered with a mattress of cotton cloth, to prevent the waxy unvulcanized tube from "breaking down" or becoming jammed. The same process is repeated until the entire sheet has been used.

This kind of tubing has an advantage over that made of one thickness of stock, inasmuch as it is very strong, and having no seam, is not liable to break open longitudinally.

When a "heat" of tubes has been made and laid upon the mattress, then comes the process of wrapping them in cloth moulds. These moulds or "formers" are simply long strips of cambric, muslin or other fine cloth, which are thoroughly wet and laid upon the rear table. The "end men," taking the top one, lift it over and stretch it upon the zinc table, and the tube is then lifted over, and having been laid upon the cloth, the edge is lapped over it, brushed down with the fingers, drawn tight, and with a quick roll wrapped as securely as a mummy in its shroud. In this, care should be taken that the cloth is not too wet, else it may slip and cause damaged places.

It is further tightened, however, by a process of rolling, either with four short boards, or with one long fifteen-foot board; the latter being preferable. Boards are sometimes covered with heavy-frictioned canvas, which increases their rolling power and prevents warping. An iron pan, upon which is laid a thin mattress of coarse cloth, receives the tubes for the vulcanizer. They may be packed in layers,

three—sometimes four—deep, depending upon the size of the tube and the weight of the mandrel. Some of the heavier ones will need supports at both ends, and a deeper bedding in the middle.

Sometimes the tube after being wrapped in cloth is heated until the rubber is thoroughly softened, and has taken the necessary form, when it is plunged into water, the cloth stripped off, and the tube then buried in French talc and vulcanized. This method saves the cloth, which otherwise would soon be burned so as to be useless, but it is not profitable, on account of the time it consumes. After the tubes are "cured" the cloths should be stripped at once, or if they grow dry and cold, should be wet before stripping. This simple precaution alone will save twenty per cent. of the cloth. In removing the tubes from the wires it is necessary to heat them slightly, after which, with the end of the wire gripped by a vice, they can invariably be slipped off without trouble.

Another way of making tubing is to have the mixed sheet spread as thick as the tube is to be, then the sheet is folded over upon itself and cut off obliquely; the two edges, of course, fit together and form a tube. Into this a wire is thrust, and it is either wrapped in cloth and cured, as previously described, or is packed in chalk without any cloth wrapping.

Tubing is made by hand of all lengths up to fifteen feet. That of which we have been speaking is rubber tubing, but much the same process is followed in the manufacture of the "C. F." tubing.

In tube making half of the time will be saved by having the "cutter," one who is especially quick, and who can keep a knife in good trim. The cloths in which the tubes are wrapped after being stripped, should be sprinkled, laid together, and folded smoothly ready for the next heat. If the sheet rubber sticks to the zinc after a heat has been rolled on the table, a little oil rubbed into the zinc and then carefully wiped off, or a slight dusting with French chalk will prevent it.

An everlasting mattress for the tube-pan may be made from asbestos, covered with a thin sheet of coarse cloth, the latter to be renewed from time to time as it is burned up.

An ingenious "blister pan" is frequently made by cutters of a sharp piece of wire, which is driven into the handle of the knife, a little above the blade, and bent away from it. In this shape it is always at hand, and cannot be lost in the scrap.

It may be that this article will strike the progressive manufacturer as a bit of ancient history, but we trust that our next installment will be just what suits him, as it will be a dissertation upon machine tubing.

—The well-known Central African Missionary, Arnot, recently cabled to London for twelve pack-mules. They were promptly shipped, but everybody wondered what he wanted with them, such an animal never having been used there before. He now writes that the discoveries recently made in rubber-yielding roots have drawn off thousands of natives who all their lives have earned their living by carrying merchandise to and from the interior. The result is that no porters can be hired anywhere. The Portuguese traders have been compelled to give up the interior trade because they can get no porters, and the missionary at Bailundu has forsaken his post on account of the failure of his supplies. Arnot writes that he needs the mules to carry his goods as far as Bihl, over two hundred miles inland, where he says he can get plenty of porters.

In the Rubber Worker's Laboratory.

III.

SULPHUR—SULPHUR CHLORIDE—CARBON BISULPHIDE AND OTHER SULPHIDES.

(*Continued from page 28.*)

THERE are no peculiar features in the processes of Marquart, Gerard, Seyferth, Huillard, etc., which need be detailed here. For such as are experimentally inclined, however, we must give place to a description of the simple apparatus suggested by Brunner. It consists merely of a stoneware retort fitted with a porcelain tube and an adapter; the last named being connected with a condensing tube which is kept cold by a continuous stream of cold water and which leads into a bottle or other receptacle likewise surrounded by cold water.

When the entire apparatus has been made air-tight, the retort is filled with small pieces of dry charcoal and placed upon a furnace, where it is raised to a red heat, and fragments of sulphur are introduced by the porcelain tube, of which the outer extremity must be kept closed after every addition of sulphur. An ordinary cork answers the purpose. As the sulphur falls into the retort it is immediately converted into a vapor which, while traversing the incandescent charcoal combines with it, producing bisulphide of carbon. The latter partly condenses into the adapter and condensing tube and is finally conveyed to the lower part of the receptacle, which contains a little water to prevent the evaporation of the condensed liquid. An opening in the condensing tube allows of the escape of the steam forced through it by the continuous ingress of cold water.

The bisulphide thus formed, as we know, necessarily carries with it a large percentage of sulphur. Of this it can however be readily freed by being distilled over a water bath at a low temperature, after which it is further purified with hydrated lead oxide and then dried over chloride of calcium or, preferably, concentrated sulphuric acid.

We have proceeded at great length in describing the manufacture of bisulphide of carbon by reason of the extensive use made of it here and abroad at this day, especially in the vulcanization of india rubber.

One fact cannot, however, be too strongly impressed upon those using either the sulphur chloride or the carbon bisulphide. Whilst the free inhalation of the first named is decidedly injurious, it is in no wise to be compared to the dangers attending prolonged exposure to the vapors of the bisulphide, and it is strange that the rubber worker has not ere this apparently been made to realize the fact more fully, and that all necessary protection is not afforded him in most of the factories where the liquid is freely employed. It is possible that at this late day, through false economy alone, many are purposely left in ignorance of the disastrous effects of both of these highly dangerous agents.

Chloride of sulphur attacks seriously the mucous membranes of the mouth and nose, as well as the throat and eyes.

Carbon bisulphide, on the other hand, exerts at first the same anæsthetic action produced by chloroform and ether, but, through continued free exposure, it will seriously impair the nervous system throughout.

Before the hands have long been immersed in this always cold liquid, they become swollen and are covered with chilblains. This is followed by numbness and, in many cases, by a general sensation of lassitude during the day and complete restlessness as well as troubled dreams at night. Some workmen have shown the effects of it in fits of trembling, fidgety displays, a light head leading to a bewildered mind and the appearance of well-seated intoxication. In other cases, the ill effects are greater through the gradual loss of appetite and consequent loss of weight, while instances, though fortunately few, are on record where impotence, signs of paralysis and loss of reason have led to necessary confinement in asylums.

Most of all this is naturally the result of continued exposure in the factory. An occasional change of occupation would, of course, prevent any serious results, when the first deleterious effects are noticeable, but the most satisfactory means of prevention is through the agency of respirators as well as of propellers or fans which, in some factories, are arranged to convey all vapors out of the building. These fans can be so arranged as to furnish a constant supply of fresh air, which will drive away all noxious vapors as well as all buffings, dust, etc., pervading the factory. Is it not, therefore, strange that some employers hesitate to introduce so simple and desirable an agent, either by reason of the expense attending the same or through an utter disregard of the welfare of those under them?

It is not our province to suggest remedies, yet we cannot refrain from mentioning the fact that a solution of carbonate of protoxide of iron in aqueous carbonic acid given to workmen to drink has been found a very satisfactory antidote.

Substitutes for the bisulphide have occasionally been put upon the markets, but have apparently met with but little favor owing to the general disinclination at making innovations. The attention of the writer was some time since called to a naphtha preparation introduced several years ago in France, as well as to an English preparation called Vulcoleine, both of which were represented as perfect substitutes for bisulphide of carbon in the cold cure, without possessing any of the latter's objectionable features, but we have failed to ascertain whether their working has justified all that was claimed for them. Upon this point we would be glad to hear, if possible, from some of our readers.

Since the aforenamed French preparation is known to be mainly composed of naphtha, it may be well, perhaps, before disposing of the subject, to merely place on record here the following extract taken not long since from the London *Lancet*: "In several large factories in Germany, especially in india rubber factories and establishments for cleaning india rubber, peculiar morbid symptoms have lately been observed. The faces of many of the girls, who had not left the factory during the day, became flushed and swollen in the evening, and they could not walk steadily. An examination of their clothes and of the work-rooms for brandy, opium, etc., yielded no result, till an accident led to the solution of the mystery. In these factories naphtha is used in large quantities, and kept in special boilers closed against the air. The girls had succeeded in getting keys to the boiler valves, and soon learning the intoxicating effects of naphtha, were in the habit of slinking unobserved to the reservoirs to inhale the poison, which threw them into a state of happy forgetfulness and conjured up a thousand sweet dreams of wealth, splendor, happiness, etc. The secret was revealed by a novice, who made too deep an inhalation and fell into hysterical convulsions."

Now, as to different applications of both the bisulphide of carbon and the chloride of sulphur.

Alexander Parkes finds that 2½ parts of the chloride in 100 parts of the bisulphuret effect "the change upon caoutchouc, gutta percha and their compounds." He immerses the articles for a short time in the solution and then plunges them in water to decompose the excess of the chloride.

Thomas Hancock and William Brokedon find that equal parts of bisulphuret of carbon and of very pure coal naphtha answer well for both caoutchouc and gutta percha.

Duvivier and Chaudet cure gutta percha in the following way: "To a solution of the gutta in bisulphide of carbon, from two to fifteen per cent. of chloride of sulphur diluted with bisulphide is added. If the bromide, iodide, fluoride of sulphur, boron, silica, arsenic, phosphorus or sulphide of phosphorus, are substituted for the chloride, then fifteen to twenty per cent. are added. If articles steeped in these solutions are likely to be damaged by the acid vapors formed during the operation, then carbonate of soda should be mixed with the solution of gutta percha in quantity sufficient to neutralize the acid formed."

Payen says that the best solvent for caoutchouc is a mixture of six to eight parts of absolute alcohol and one hundred parts of sulphide of carbon.

Bowra cures india rubber and gutta percha by taking 50 lbs. of either and adding thereto 25 oz. of chloride of sulphur as well as 25 oz. of dry hypochloride of lime, working them well in at a temperature of 60° F. and subjecting the whole for two hours to 100° F.

La Société Chartier et Compagnie vulcanizes caoutchouc by taking rectified or refined petroleum, or the "mixed petroleum," saturated with sulphur and combining it with chloride or bromide of sulphur.

Abbott passes the articles to be vulcanized through a chamber containing the vapors of chloride of sulphur.

Not very long since Mr. Charles A. Fawsitt laid before the Society of Chemical Industry the result of numerous experiments made by him in order to ascertain the quantity of sulphur retained by rubber when different kinds of varying strengths of solution were used "and also the degree of elasticity retained by each sample of fine cut sheet" employed.

Of the different preparations of commercial sulphur chloride, he selected three of which the analysis showed:

	Color.	*Chlorine.*	*Sulphur.*	*Spec. Grav.*
No. 1.	Light.	52.09	47.33	1.682
No. 3.	Light.	51.27	48.30	1.685
No. 5.	Dark.	60.03	39.67	1.657

For the first series of experiments he took Nos. 1 and 5 and, as he states, "also distilled the more volatile portion off a sample of No. 5, in order to see what effect a chloride having an approximate composition to $S.Cl_2$ would have, only collecting the portion which came over under 64° C." Each piece of "cut sheet" was warmed to free it from all possible moisture, dipped fifteen seconds and finally dried in an air-bath at 60–65° C. (140–150° F.).

No. of Expt.	Variety of Chloride.	Proportions by Volume.		After Treatment.	Per cent. of Sulphur retained.	
		Chloride.	Bisulphide.		1 in 60.	1 in 30.
1	Light.....	1	60	Washed twice in bisulphide	0.464	....
2	Light	1	60	Not washed	0.621	....
3	Light.....	1	30	Washed twice in bisulphide	....	0.791
4	Dark	1	60	Washed twice in bisulphide	0.785	....
5	Dark	1	30	Washed twice in bisulphide	....	1.461
6	Volatile ..	1	60	Washed twice in bisulphide	1.144	....
7	Volatile ...	1	30	Washed twice in bisulphide	....	1.839

The second series of experiments embraced Nos. 1, 3, 5, and the volatile portion distilled from No. 5. For Nos. 1–9 the proportions were 1 chloride to 60 bisulphide, for Nos. 10 to 15, 1 to 30, and for No. 16, 1 to 15; the time dipped being in each case 15 seconds, with exception of experiments 1–2, in which the dipping was but 3 seconds.

No. of Expt.	Variety of Chloride.	After Treatment.	Remarks.
1	Light 1	Not washed CS_2.....	Soft and elastic.
2	Dark 5.....	Not washed "	Not as elastic as No. 1.
3	Light 1	Washed "	Not as elastic as No. 1.
4	Light 1.	Not washed "	Not as elastic as No. 1.
5	Light 3....	Washed "	Not as elastic as No. 1.
6	Light 3.....	Not washed "	Not as elastic as No. 1.
7	Dark 5.....	Washed "	Not as elastic as 3 or 5.
8	Dark 5.....	Not Washed "	Tendency to harden.
9	Volatile SCl_2....	Not Washed "	Blistered and rotten.
10	Light 1.....	Washed "	Soft and elastic.
11	Light 1.....	Not Washed "	Soft and elastic.
12	Light 3..... ...	Washed "	Soft and elastic.
13	Light 3.....	Not Washed "	Soft and elastic.
14	Dark 5	Washed "	Rotten.
15	Dark 5.....	Not Washed "	Rotten.
16	Light 1.....	Washed "	Soft and elastic.

Mr. Fawsitt says: "From the above experiments, taken in conjunction with amount of sulphuric acid formed, when mixed with

water, I should conclude that the dark chloride is not so well suited for vulcanising rubber as the (light) yellow; in fact, the chloride with the least color has the least damaging effect on the rubber."

We will close by adding

DEVILLE'S TABLE OF THE SOLUBILITY OF DIFFERENT VARIETIES OF SULPHUR IN CARBON BISULPHIDE.

Variety of Sulphur.	Parts of sulphur dissolved by 1 pt. CS_2.	Temperature C° C.	Fraction of original weight insoluble in CS_2.
Octahedral, from Sicily	0.335	18°	0.000
Crystallized, dry way, recently prepared	0.415	13	0.029
Cryst'd, dry way, prepared 8 years	0.333	13	0.004
Cryst'd, dry way, prepared 9 years	....	..	0.030
Cryst'd, dry way, prepared 15 years	....	..	0.051
Red needles, recently prepared	0.333	13	0.043
Soft yellow, recently prepared	....	..	0.353
Soft yellow, prepared 2 years	0.316	11	0.137
Soft red, recently prepared	0.374	11	0.157
Soft red, prepared 5 years	....	..	0.181
Flowers of sulphur	0.351	18	0.113
Flowers of sulphur, another sample	....	..	0.234
Roll brimstone, outside	....	..	0.029
Roll brimstone, inside	....	..	0.073

(To be continued.)

"Wrinkles."

IN the November issue of THE INDIA RUBBER WORLD we made some reference to blood being used to "stick" rubber to iron. It seems that in doing this we stirred up the bile of one of the old rubber men, for we received from Central New York a letter that read somewhat after this fashion: "Dear Sir—I read your article on "Wrinkles," and I believe that in making the remarks you did about blood you meant me. Now I believe that I can do just what I say, and although I am not working in a rubber mill at the present time I will put up a $5 bill that I will stick rubber better to any shafts by the use of blood than can be possibly done with any acid, or without nothing."

Now, we do not feel like saying that in some cases blood may not be a good thing—in fact, it is well understood that blood is thicker than water, and no doubt is a better sticker than the "nothing" that our correspondent mentions. We remember, also, that it was told us that in one of the Jersey mills where an accident happened to a grinding-room hand, and blood was spattered upon one of the rolls of the mixer, that in that spot, no matter how hot the rolls were or how soft the gum, the rubber always stuck, thus in ghastly fashion recalling the accident when it should have been long forgotten. Still, we must say that we believe, as we said before, that the era of blood has gone by.

Just now, when the rubber men are so particularly interested in colors for "markings," and in getting out the spring lines of hose, when also the clothing men are looking about for new and beautiful stripes, or something that will take the place of the popular wine color, our thought is drawn to a happening in a large mechanical goods factory. It seems the superintendent discovered a coloring matter that made a very beautiful green hose, and a hose that became at once popular. The men in the mixing-room were not fond of the new compound, for it was whispered that it was paris green. This information so worked upon the mind of one man that inside of a few days he became ill and reported to the superintendent with a pitiful story about his symptoms, and ended by declaring that he should ask for damages for working in that poisonous stuff. Then came the queer part of the tale, which was embodied in the superintendent's reply, that the pigment had no trace of poisonous matter in it, and was as far from being paris green as if it had been made from pure gold. When this assurance found its way through the man's solid skull he convalesced very rapidly.

This instance leads us to the thought that the question of poison in rubber mills is, after all, something that is more in the mind of the workman than anything that has reality. We recall the case of a man whom we once employed as grinding-room hand. For several years he had been "used up" by lead poisoning, but we could not help noticing that when there was a fire, or when any special spree was in order, his arms straightened out and were as flexible and useful as those of men who had no trace of his complaint. A further testimony to the fact of the healthfulness of rubber factories comes in the statement of one who is a power and leader in the manufacture of mechanical goods in the United States. As a boy he was rather weakly, and so much so that he was kept out of school a great deal, but when he went into a rubber factory at an early age, to assist his father, his health all at once seemed to become firmly established. Since that day he has grown into a vigorous man, both physically and intellectually, and has done work that would kill half a dozen ordinary men.

On the cars the other day a friend told us a little story that struck us as being well adapted for "Wrinkles." The occurrence dates back some years, to the time when the Hancock patents on the sulphur cure were in force. A bright young American went over to England and started a factory, using as a vulcanizing agent, in the place of sulphur, something that was little known then: hyposulphide of lead. He had hardly begun manufacturing, however, when the sulphur-cure people shut down upon him, accusing him of infringing upon their patents, the matter being immediately brought into the courts. One of the first things called for by the judge was samples of the goods manufactured by each of the disputants. The Yankee brought forward his rubber, and his rivals brought forward theirs, and to any but an expert the two looked exactly alike. The American, however, in examining his opponents' sample, detected the fact that it was not quite vulcanized, and immediately there flashed into his mind a "wrinkle" that he was familiar with, by which he thought he could convince the judge that his goods were entirely different from those of the opposition. He, therefore, cut off a cubical inch of his own vulcanized stock, and asked the judge if he might have a cubical inch of the other, in order to try an experiment. Permission was at once given, and a messenger dispatched for two bottles of camphene. In each of these bottles was put one of the cubes, which were sealed up and left until the following day. On the morning of that day, when the company convened in the court-room, it was found that the sample made by the defendant lay at the bottom of the bottle of camphene exactly as it had been put there, while that of the prosecution, owing to the fact that it had not been fully vulcanized, had swelled up so that it almost filled the bottle. This little experiment, of course, was in a measure a trick, but it convinced the judge that the two articles were radically different, and the American was allowed to go on with his manufacturing.

The closing "wrinkle" that we shall give in this installment is something in the way of a suggestion; but first for a preamble:

Some years ago a New Hampshire farmer, who knew but little of the rubber business, manufactured a spinning-roll of rubber that ran for weeks in oil and still continued unaffected. So pleased were numbers of capitalists with the roll that a company was at once formed and a plant prepared for manufacturing it by the hundred thousand. A little cloud, however, appeared in the horizon at the start, and, although it was no bigger than a man's hand, it grew with amazing rapidity. The farmer had not preserved the compound of which he made the first roll, and when he tried to match it he got a different result. Still sure that he could do it, he experimented and experimented, and even after the capitalists left him in disgust he kept on experimenting—in fact, he spent the rest of his life in fruitless effort to again duplicate that matchless roll, and after all failed. Now, it is said that the want still exists for a perfect spinning-roll covered with some sort of rubber compound that shall do away with the present expensive calfskin covering. The "wrinkle" that will enable any manufacturer to make that perfect roll is well worthy early consideration.

—That irrepressible free lance, *Texas Siftings*, is moved to remark that "Although revolution in Brazil has affected the rubber market somewhat, a rubber of whist in the Harlem Club remains at the same figure."

Recovered Rubber—A Criticism.

To the Editor of The India Rubber World:

My attention has been called to the communication on page 31, of your last issue entitled, "The Past and Present of Old Rubber." It is an old adage that mistakes will occur in the best-regulated families, and an axiom that the rectification of such is always desirable. Having been professionally related to some of the largest manufacturers of rubber goods, and those engaged in experimental operations for the improvement of the manufactures about thirty-three years, I have not only endeavored to keep posted on its literature regularly, but have had all the facilities desirable for personally knowing its progressive steps.

Nathanial Hayward was engaged in the manufacture of india rubber shoes and boots in 1859, and claimed only to use old rubber by powdering it and mixing it as a powder with new rubber *for the heels*. I had several conversations with him that year at Beverly, Mass., respecting the Beverly process for restoring old rubber.

The Beverly Rubber Works did not fail, but burned in 1862, while working every hour of the twenty-four on United States army equipments. The owners removed its operations to Naugatuck, Conn., and the works are still there.

The date of both Francis Baschnagal's and Hiram L. Hall's patents, for restoring old vulcanized rubber waste, was 1858. The process was worked, however, at Beverly a year previous to the date of the patent, and also at the factory of the New York Belting and Packing Co., Newtown, Conn., at the same time.

In regard to the third paragraph of the communication referred to, although the matter is not of the remotest interest to me now, except so far as relates to facts, I will state here, that in works constructed after my plans for working waste rubber, at Greenpoint, L. I., near Newtown Creek Bridge, leading to the then Hunter's Point, in the year 1863, a series of chambers were constructed with a blower at one end for separating the fibre from the finely divided rubber. This plan was an exact copy of those now and then in long use by furriers, for separating the hair and fur from bits of pelt, after the skins have been finely divided by revolving cylinders, composed of circular saws arranged on a shaft. Tons of waste were there worked, while the doors of the building were open to a principal thoroughfare, and hundreds stopped to look in from curiosity. There was no privacy about it, nor novelty claimed.

In the fourth paragraph it is stated that "the acid bath process was an old one that had been used for years," when the patent, etc., was granted. It was my province to examine the records as to the novelty of the process, some time since, and I failed to find anything that could be construed against it.

I will simply add that the paragraph pays a very poor compliment to the able and hard-working examiners of the Patent Office, who have unequaled facilities for determining such questions. Very respectfully,

Dubois D. Parmelee, M.D.,
Practical and Analytical Chemist.

A Word about Hard Rubber.

THE manufacture and manipulation of hard rubber is so different from that of soft rubber that it hardly seems as if the two industries were even related one to the other, and yet almost any soft compound may be made hard by increasing the sulphur and augmenting the cure. Of course the adulterants that enter so largely into soft rubber are not added to the hard in such large proportions; indeed, much of the hard rubber, the best of it, is simply rubber and sulphur. When hard rubber is black it is properly called ebonite, and when colored it goes under the name of vulcanite.

It is just as necessary to wash the crude gum for hard rubber as it is for soft, and sometimes more so, as the Java or Madagascar or Borneo that is used may be full of foreign matter that would spoil the "sheet" or "rod" into which it is going to be transformed. After being washed and dried, the next process is to incorporate it with sulphur. It is prepared for this incorporation by being kneaded, or massed, between cylinders turning at different rates of speed, so as to produce a vigorous and thorough grinding. The cylinders are of chilled iron, and are kept heated by internal injections of steam.

The caoutchouc, after nearly an hour's kneading, is of a pasty consistency, eminently suitable for the absorption of sulphur. Perfectly pure flowers of sulphur is used, very finely pulverized. It is introduced little by little to the soft gum, which continues for another fifty or sixty minutes undergoing the action of the rolls. The dough is of a dark chestnut color, but as the proportion of sulphur absolved increases, it takes the hue of yellow ochre, and keeps this color till it passes through the heating process, when it becomes permanently black.

The proportion of sulphur in hard rubber varies according to the nature of the articles it is intended to manufacture. For those in which suppleness and elasticity are required—as in artificial whalebone, walking sticks, etc.—less sulphur must be used than where rigidity is required, as in rulers, discs of electrical machines, etc. Below twenty per cent. of sulphur hardness is not produced, and there is little use in going beyond fifty per cent.; as, although a greater degree of hardness is obtained, it is then accompanied by extreme brittleness.

The admixture of caoutchouc and sulphur being completed, the material is now ready to receive whatever form is desired, either by moulding or any other process, previous to vulcanization. Much of the material is vulcanized in the form of plates or slabs. The dough issues from the cylinders in a sheet, from which slabs are cut of the required dimensions, and are received, still soft, on a frame covered with wet canvas. They are then plunged for a short time into tepid water. By this immersion they are rendered firmer and partially cooled, and a certain shrinkage is effected which would otherwise take place during vulcanization, and mar the result. At length the slabs are wiped and placed on trays previously thinly covered with a preparation to keep from sticking. The slabs are pressed down on the trays, powdered with talc to prevent adhesion, when they are ready for the next process—that of vulcanization.

The vulcanization of hard rubber is accomplished by the

"wet" or steam heat. A strong cylindrical boiler is used with special mechanical contrivances for securely closing up the end when in rise, and furnished with a small railway for facilitating the ingress and egress of the articles to be vulcanized. These objects are placed in variously constructed iron frames mounted on the cars of the railway. The frames destined to receive the tablets or slabs are inclined at an angle of about forty-five degrees. This inclination is necessary in order that they may not run when softened by the heat, and that the water which may condense on them during the process may pass off.

When the cars are loaded they are pushed into the boiler, the door is fitted in its place and tightly secured. Steam (at a pressure not exceeding four atmospheres and a half) is introduced, and the operation goes forward. The steam penetrates the boiler by means of a tube, which is pierced with little holes on the under surface from one end to the other. The introduction of the steam must be regulated in such a way as gradually to raise the interior temperature to the point required, which is from 300 to 325 F., and from this moment to preserve an even temperature during a predetermined period of time.

The time required to reach the desired temperature, and the time during which the heat must be sustained, will depend upon the slabs or articles being vulcanized. The first period may be two, three or four hours; the second seven, eight, ten, or even twelve hours, according to circumstances. An eminent industrial authority states that no fixed basis has hitherto been established for the length of time required to satisfactorily vulcanize hard rubber. Thus, on several occasions there have been vulcanized in the same apparatus, pieces of the same thickness, formed of the same material (as to proportions of sulphur, etc.), with a temperature maintained at exactly the same degree, and after eight hours the work has been thoroughly done, whilst at other times, after ten hours of the process, there have been pieces that it was necessary to put back for two or three hours longer. Often, too, in the same operation, thick pieces have been found thoroughly finished, and other pieces, much thinner, have required further treatment.

When the process has been satisfactorily performed the hard rubber fully deserves its name, and is of a beautiful black color. When it is not sufficiently baked it is soft, somewhat resembles boiled leather, and is of a greenish hue. These defects can be remedied by putting it in to cure a second time. If, on the other hand, the operation has been too prolonged, the rubber has become burnt (as it is called), it is spongy, and is of use for no purpose whatever.

There is one inconvenience to which the operator is more particularly liable in the case of slabs or tablets. The steam in condensing causes drops of water to trickle over the slabs while still soft; these drops deposit oxide of iron (found at the expense of the metal of the boiler). The result is that bubbles and specs are often formed on the surface of the slabs, tending very much to the deterioration of any objects fabricated from them. Payen says: "One might succeed, probably, in preventing these annoyances—possibly by keeping the slabs of caoutchouc vertical between two sheets of tin, or it might be done by placing over the framework holding the slabs a sheet of tin, forming a roof sloping each way. Such a roof interposed would receive from above the droppings of condensed steam, and let them roll off clear of the tablets."

The hard rubber, as we have said, is naturally of a beautiful black color, and is then called ebonite. But it can be made artificially to assume a great variety of colors by proceeding in the same way as with ordinary caoutchouc. That is to say, by incorporating with the paste, before vulcanization, oxide of zinc, chrome green, vermillion, etc.

In order to work hard rubber the same processes are employed, and the same tools used as in the case of horn and ivory, and most hard substances of a similar character.

Moulding combined with pressure is equally effective with tool work in the treatment of hard rubber, which, indeed, lends itself with special facility to this process, inasmuch as it softens by a short exposure to heat. When it is taken from the moulds it quickly cools, and preserves intact all the impressions it has received.

Aside from the beautiful blacks that are found in combs, buttons and other articles made of ebonite, there are elegant colors produced for dental plates. Indeed, dental vulcanite in its real shades, and especially in its pinks, has been the object of a deal of solicitude on the part of the hard rubber man. Something for which many have tried has been a white hard rubber. It is said it was once produced in the best of shape and faultless color by a New York manufacturer, but his superintendent could never again hit the same compound. If this rumor is authentic, the day will no doubt come when white hard rubber will be a common thing, and the billiard ball manufacturers will be happy.

Tischer's Patent Frictionless Jack.

THE lifting jack known as "Tischer's Patent Frictionless Jack," which we here illustrate, is said to be superior to all others, in that it can be applied at all times to the various uses which such a machine performs. The range of application of the hydraulic jack and others is always limited, but with this one it is unlimited.

The load is carried by a screw made of a special crucible steel. It lifts from the ground as well as from the top. The entire weight on the screw is borne by a frictionless turn-table, the principle so successfully adopted for locomotive turn-tables and for swing bridges. The clamp joint containing the little gears swivels around the neck of the body, and it may be clamped at any point of the compass; thus the power may be applied at any side of the jack.

This jack has also different speeds, which is very convenient, for it enables the screw to be run in and out rap-

idly under light loads, and furnishes greater power when heavy work is to be done, simply by changing the handle to the lowest stud. The hydraulic jack requires propping when the load is on and the work stops (else it will go down at once), but Tischer's jack will hold the load without propping as long as desired. It is specially adapted for use in rubber mills, and it is made by Messrs. Ohl & Haefner, No. 15 Alling street, Newark, N. J., who also make excellent patterns of rubber mixing and grinding mills, and a very strong rubber press.

Trade Notes.

AN esteemed contemporary, speaking wisely of the rubber mills of this country, states that there is no mill west of Buffalo. Now we are not anxious to contradict for the mere pleasure of it, but we cannot help just mentioning that in our trips West, after leaving Buffalo, and starting toward Chicago, that we are accustomed to stop off at Erie to see the Erie and Lake Shore Rubber Mills, at Ashtabula to view the London Rubber Co., at Cleveland and Akron to enjoy two splendid plants. Beside this, we meandered out to the Lime Kilns in Chicago, to stop at the Chicago Rubber Works, and called on Fred. Morgan of the Morgan & Wright Co. If we had the time, we would have ran up to Racine to buzz jolly Mr. Laughton. Then there was Cattelle & Co. in Cincinnati, and the new Muncie Co. No doubt some direful calamity has overtaken these mills and blotted them out of existence, for it cannot be that our brother journal would state that there were no rubber mills west of Buffalo, unless it were a proven fact.

—Among the recent visitors to New York from the West, was Mr. H. C. Corson of the B. F. Goodrich Rubber Co., whom we did not see, as business called us to Philadelphia; but we take this time to shake his hand metaphorically, and greet him even if it be a trifle late.

—The only mill in the country run on rubber work by the use of natural gas, so far as we know, is that of the Muncie Rubber Co., of Muncie, Ind. They are said to be doing a rushing business and have the true Western push and confidence in their plant, their goods and themselves.

—One of the best testimonials to the wearing qualities of the rubber set and bound brush of the Rubber and Celluloid Harness Trimming Co., Philadelphia, is the fact that they have been used as cement brushes for more than a year and yet come out clean, bright and uninjured.

—At Shelton, just opposite Derby, Conn., is the new plant of the Derby Rubber Co., and it is finely situated for the business of shoddy manufacture, and splendidly equipped. The main building is of brick, and is situated midway between the river and the canal, while the railroad runs just in front of the door, a fact that greatly facilitates the shipping of stock. The machinery consists of seven new grinders, built by the Birmingham Iron Works, while the huge washing-tank is set down in a pit, that, if necessary, can be flooded with the whole of the contents of the canal. The mill is run by water-power, and Mr. Askam says, since he started up he has all the work he can attend to. Mr. Askam, by the way, will be remembered as one of the former partners in the Northboro Rubber Co., and is accounted one of the most skillful recovered rubber men in the country.

—The "Alice Mill," as the new plant at Woonsocket is to be called, is to have some mixing mills that are evidently built for business. They are forty-seven in number, and have huge rolls twenty inches in diameter, and sixty inches face. They are to be built by the Birmingham Iron Works, and are well under way, part of them being already finished.

—President H. H. Tyer, of the Tyer Rubber Co., has gone on a trip through the South in company with a number of business friends.

—Another old land-mark gone—the tubing-machine that squirted so many thousand feet of hard rubber tubing for the old Novelty Co., of New Brunswick, N. J., has gone to Boston, while the calender has been purchased by a Massachusetts company, for experimental work in coating fabrics with a new rubber-like compound.

—At the office of the Candee Rubber Co. in New Haven, is a curiosity in the shape of an old iron boot-heel that was formerly an object of much interest in the rubber world. It was the invention of a Rhode Island genius, and was designed to supersede the ordinary heel on rubber boots. That it was much cheaper than rubber no one could question, but how to attach it to the boot so that it would stay was beyond the wisest, and even if it had been made fast, the clattering of an iron heel over pavements of wood and brick and cobble-stone, gave promise of an insuperable obstacle to its popularity. Still, the inventor spent $300,000 upon it, and others sunk as much more before it was finally abandoned. And now Superintendent Elliott has the last of these heels in a drawer in his office, and when visitors draw on him for experiences of the past, he takes it out and gives them a most interesting history of its rise and fall.

—Mr. Arthur Klaus, who represents the Chicago end of the Boston Gossamer Co., and who does it extremely well, is in Boston for a short time visiting his relatives, and posting himself for an aggressive spring campaign.

—Mr. R. A. Leigh of the Boston Car Spring Co., has just left Boston for an extended Western trip. He is armed with new and handsome samples and fair prices, and goes out with the promise of good trade.

—The Columbia Rubber Co. have purchased the remainder of the goods and machinery of the defunct Connecticut Rubber Co., at Norwich, Conn. Of the machinery they secured a fine coating-machine, a new mixing mill, nine cement churns, all of which are set up in their mill at East Braintree. In addition to this, the Columbia Co. have just put in a large vulcanizer for steam curing, and are turning out a splendid quality of white sheeting.

—The Hartford Specialty Manufacturing Co. have bought the entire interest of the Hartford Heel Plate Co., and will continue the business at the old place, No. 5 Grove street, Hartford, Conn. They will also manufacture and sell specialties of all kinds.

—The Boston Gossamer Co., not satisfied with the size of their new plant at River street, are erecting still another building for the making-up of rubber clothing. This structure is 175x82 feet, three stories in height, and will have three hundred and fifty sewing machines in it. In spite of the cold weather, Mr. Klaus has a large force of men at work, both outside and inside of the new buildings. The former are engaged in grading the land so that it will fall in a gentle incline down to the pretty pond that is by the side of the factory.

—Mr. J. Edwin Davis, Treasurer of the Boston Woven Hose Co., and Mr. Butler of the same Company, have gone on a business trip to the Pacific Coast. It is probable that Mr. Davis will not be back to his Boston office before 1890, and Mr. Butler purposes to remain in San Francisco in the interests of the firm.

—Mr. Joseph Warner, the former assistant superintendent under Joseph Holmes at the Bozrahville factory of the Hayward Rubber Co., is working for the Colchester Rubber Co., as head of the calender room.

—A remarkably complete mill, or better than that, a plant that is without exception the neatest, cleanest and most compact for machine work that we have ever seen, is that of the Mason Regulator Company at Milton, Mass. It consists of a two-story brick building, built "on honor," and is furnished with a Sturtevant engine, the latest milling machines, lathes, and the very best tools that the market affords. For the past six months the company have been running chiefly on their Reducing Valve and Pressure Regulator, for which they have had a remarkable call. They are, however, bringing out new goods, among which are a very simple and effective Damper Regulator, and a new Steam Trap, to both of which we shall doubtless call the attention of our readers in a later number.

—During the recent Lynn fire the factory of Spinney, Virtue & Co., seemed for a time to be in danger of destruction. The flames came so near that they had already attacked an adjoining building, when one hundred and fifty men were detailed with buckets and hose and various receptacles for holding water to wet down the sides of the building. As it was on the edge of the dock, and water plenty, they succeeded in averting what would have been quite a calamity to our friends, the rubber soleing and counter manufacturers.

—Speaking of recent fires, at that in Boston, which so quickly followed the Lynn conflagration, The Woonsocket Rubber Company, whose office was in the handsome Brown, Durrell building, were burned out. The loss amounted to about $100,000.

—The many Boston friends of Mr. Henry Burr, of The Granby Rubber Company, Quebec, were delighted to receive a visit from him recently.

—To the customers who penetrate to the office end of David Hale's rubber store on School street, Boston, we wish to say that the huge "combination-suits" made of heavy rubber and duck, are not worn as a new kind of night dress for traveling men, but are suits of diving armor in the manufacture of which Mr. Hale is an expert.

—Mr. Thomas Bell and Mr. Richard R. Whitehead, representing two of the prominent Trenton rubber mills, have returned in good health and well satisfied with their European trip.

—Mr. J. J. Field, of The New Jersey Car Spring Company, has been spending a month at Old Point Comfort, where he has been recuperating from hard work at the factory.

—The largest rubber spring that we have any information of is one lately made by the Boston Car Spring Company. It was made of a very nice quality of compounded rubber, was 18 inches in diameter, 21 inches in height, and weighed 302 pounds.

—The Newton Rubber Company have recently put in two of the Edred Clarke presses, with which they are delighted.

—Joseph Moseley, Esq., of David Moseley & Sons, of Manchester, England, has just left these shores after a visit of a few weeks in connection with their American patents which are now used by the Gossamer Clothing Co., of Boston. He was at home to his friends at the office of the Mineralized Rubber Company—the firm's American agents—during his stay in New York. The establishment of Moseley, just outside of Manchester, is the second oldest in the world and employs over 1,800 hands.

—The Boomer & Boschert Press Co., Syracuse, N. Y., have recently received an order for four of their vulcanizing presses from the Davol Rubber Company, Providence, R. I. Also one for H. O. Canfield, Bridgeport, Conn.

—Messrs. W. D. Allen & Co., of Chicago, though jobbers only, issue one of the largest and most complete catalogues of rubber goods that the trade can boast. They believe in printers' ink, and the wisdom of their faith is shown in the fact that they they do an immense business in rubber goods throughout the whole Western country.

—The entire plant of the Universal Rubber Company, Hoboken, N. J., is offered for sale in this issue of THE WORLD by Mr. H. J. Hopper, the receiver. Full particulars will be found in the advertisement on folio XIII., and a printed inventory embracing everything included in the plant, will be forwarded on application.

—The Boston *Advertiser* says: "The Metropolitan Rubber Co., that located its works in the Wilson Sewing Machine factory at Wallingford less than eight months ago and started business with only thirty hands, now employs 350, and is occupying all available space in the factory."

—The editors of THE WORLD take special pleasure in acknowledging a call from Mr. Perase Deverell, of the Lake Shore Rubber Company, Erie, Pa. Mr. Deverell is in the East looking after the interests of his firm, and business is certainly good with him, for he is bubbling over with good nature: "I am more than pleased with the paper, as I think it was just what was needed in the trade. I am sure every traveling man in the rubber business will rise up and call you blessed," is the generous way he puts it. Come again, Mr. Deverell.

—We are pleased to record the fact that Mr. Jno. D. Vermeule, President of the Goodyear's I. R. G. Mfg., is about again after a long siege of confinement to the house nursing a severe cold. And speaking of Mr. Vermuele, calls to mind an interesting feature of the business policy of his company. On the sample table where their many patterns of boots and shoes are displayed, are numerous sheets of unfinished rubber. These are so fine, soft and elastic that they can be compared only to a rubber band. "That," said Mr. Van Bleit the other day, "is the stock of which our boots and shoes are made. It is so good that now and then a buyer refuses to believe that it is used. So we simply ask him to make a selection from any part of our stock, and after we have removed the lining and varnish before his eyes, he is invited to compare the rubber with these sheets. The result is always the same: we invariably make a customer and a walking advertisement of our goods. And that goes far to explain the success of the 'Glove Brand' of boots and shoes."

—The Standard Rubber Company, Campello, Mass., are building an addition to their factory to be 100 feet in length and 75 feet in width, which is to be used for the coat makers and as a stock room. The space thus vacated from the old buildings will be used for a calender room and an enlarged cutting room. In addition to this building, they have a new annex in Brockton, where are some forty sewing machines used in making up gossamer garments.

—We visited the plant of the Chelsea (Mass.) Wire Fabric Rubber Co. a day or two since, and were much pleased with its general plan. The main buildings are of brick, and are built to give the most light and air, both for the grinding-room hands and for the workers in the hose and belt rooms. The 150 Harris-Corliss engine furnishes the power, being run by two Hodge boilers manufactured in East Boston. The belt press is of Birmingham pattern and is fitted with a new patent belt stretcher, with which Mr. Bell, the superintendent, is very much pleased. The calender is also a Birmingham machine with 60x20 rolls. The vulcanizers are from the works of the Whittier Machine Company, that for hose being 54x3, and set in a side of the hose-room, while its mate is 15x5 feet. A peculiarity in this mill is the three machines for attaching the metallic guard to the belting. This metallic edge, by the way, has already proved itself of great value in belts that have been sent out for testing, as it saves wear and tear to a great extent and allows the use of the ordinary iron shipper.

—The new store of the Boston Woven Hose Company, at 226 Devonshire street, is perhaps one of the most complete in the country. It has a depth of 116 feet and a width of 55 feet, the book-keeper's office being in the rear, while the handsome office of the treasurer is in the front. The floors are covered with solid piles of hose, great stacks of packing and lengthy rolls of belting. On either side of the main aisle running through the store, are the desks of Mr. Robinson and Mr. Darling in easy touch of any incoming customers. Above the piles of goods are galleries upon which are stored fire supplies and a general line of mechanical rubber goods in infinite variety.

—Among the recent trade-marks granted by the United States Patent Office, we note one on the word "Tyrian" to the Tyer Rubber Company, Andover, Mass., which they have adopted to protect themselves and their customers from inferior goods. The word "Tyrian" is derived from the family name of the founder of the company, Mr. Henry G. Tyer.

—From the *Manufacturers' Gazette* we learn that "the Woonsocket Rubber Company imports the crude rubber used in the works of the company at Woonsocket and Millville direct from Para to New York. An effort is being made by Joseph Banigan, President of the company, to have future shipments made direct to Providence at a great saving. It is expected that a large invoice recently purchased will be shipped to Providence by a steamer now on its way to Para."

—The Colchester Rubber Co. closed down one of their departments the other day, for the double purpose of taking stock and overhauling the machinery; and thereupon some malicious individual reported to the newspapers that they had suspended operations. The rumor was, of course, promptly denied, and we learn that the exact facts in the case are these: For a year past the factory has been running practically night and day, stopping only for public holidays. Their machinery, both old and new, having been worked for all it was worth, needed repairing; and, besides, it was necessary to take stock. It was therefore thought advisable, as soon as the rush for the winter and holiday trade was a bit off, to shut down a portion of the factory, line up the shafting, repair the mills and get in shape for a fresh start. In consequence, the boot department is now undergoing repairs; the shoe department will continue to run till the 21st inst., and on the first Monday in January the entire plant will again be in full operation.

—The American Rubber Company, Boston, have opened another branch store in New York, at 78 Reade and 99 Church streets, where they will be in the heart of the boot and shoe district. Mr. Charles J. Osborn is in charge.

—A well-known rubber superintendent recently advertised for a skilled rubber man in the mixing room. In response to his inquiries, one of the men who came to him brought a voluminous compound-book, and seemed to base the whole of his expectations upon it. The superintendent very sensibly asked him to close the book and to write him out a dozen compounds for such goods as he claimed to be an expert in manufacturing. But this the man was utterly unable to do, and as a natural result did not get the job.

—Messrs. Thomas W. Plumb and Clifton J. Morse have located permanently at Indianapolis, to look after the interests of the Gutta Percha and Rubber Mfg. Co. in Indiana, Ohio, Kentucky and Tennessee.

—Mr. B. F. Sutton's many friends will be glad to know that he is about again, and that the broken collar-bone is whole once more.

—The firm of Hume & Weed, Acme Rubber Works, Centre street, New York, have failed, and are in the hands of a receiver. Liabilities small.

—Mr. R. A. Loewenthal is home from his European trip, looking both pleased and prosperous.

A Happy Occasion.

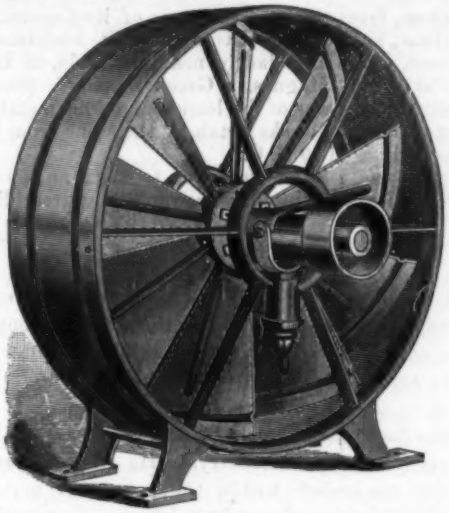
THE completion of the extensive new plant of the Goodyear Gossamer Company, at Hudson, Mass., was celebrated on the evening of the 26th ultimo, by a factory warming which will go down into memory as one of the most notable and happy events that have ever occurred in rubber circles in New England. About five hundred guests were present; the entire plant was brilliantly lighted by electricity; a sumptuous banquet was followed by toasts from notable persons present, and the affair wound up with a merry hop, which lasted till far past midnight.

The daily papers of Boston devoted lengthy accounts to the affair, and among other things the *Globe* congratulated the people of Hudson upon the location there "of the finest and most costly gossamer rubber plant in New England, if not in the country." The *Herald* said: "From a small beginning these two pushing men [L. D. Apsley and J. H. Coffin] have increased their business, and now control the largest gossamer manufacturing plant in the country. They have increased their business nearly 1000 per cent. The senior member of the firm is President of the Gossamer Manufacturers' Association of the United States."

The editorial staff of THE WORLD regretted exceedingly that they were unable to accept the cordial invitation to be present. We are glad, nevertheless, to add our God-speed to the many well-wishes that have greeted the advance step of this prosperous firm. Good luck go with you, gentlemen.

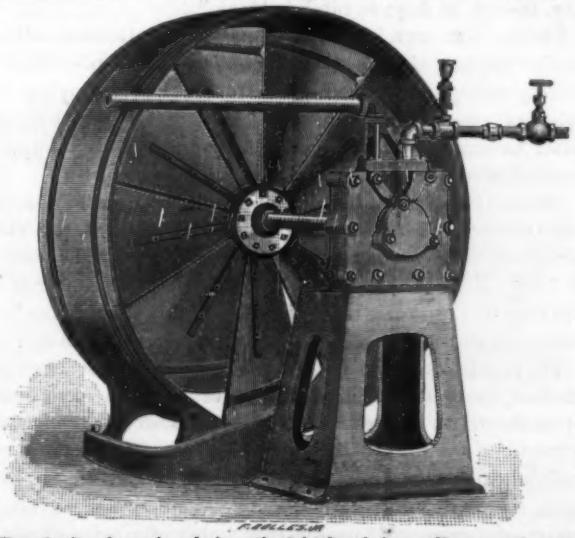
The Ventilation of Work-Rooms.

NOTHING is so conducive to a sound body, a clear brain and intelligent, productive labor as a plentiful supply of pure air at a proper temperature in the work-room; and in very many instances thorough ventilation can only be obtained through the use of properly placed ventilating appliances. We here illustrate the improved exhaust-fan made by Geo. P. Clark, Windsor Locks, Conn., well-known in the rubber trade.



The following points of superiority are claimed for this fan: economical adjustment of capacity and power; self-oiling and adjustable; great capacity to handle air; least amount of power required for work accomplished; noiselessness; convenient form and lightness. These fans are not only adapted for ventilating, but are also admirably suited for drying wool, cotton and other material.

In connection with his exhaust-fan, Mr. Clark now manufactures a combination of fan with steam-engine as illustrated herewith.



The shaft of engine being the shaft of fan, all expensive and annoying belt connections are avoided. This combination is particularly adapted for use in night-drying, when the wheel or large engine is shut down; also in places where it is necessary to set the wheel at a distance from any line of shafting. These engines are capable of high speed, are light-running, durable, noiseless and economical of steam. Mr. Clark will be pleased to correspond with parties interested, and to furnish catalogue or other information.

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ANNALS

—OF—

Electricity, Galvanism, Magnetism and the Telegraph.

Electricity, *elektron, electrum,* meaning amber, from *helko,* to draw, in reference to its property of attracting light bodies.

Galvanism, from Galvani, the name of its discoverer.

Magnetism, *magnes,* the natural magnet, loadstone or lodestone, found abundantly near Magnesia, in Lydia. It is said that Magnes, a Greek shepherd, observed the attractive power of the loadstone on his metallic crook, and that the Greeks obtained the stone from Magnesia as early as 1000 B. C.

Telegraph, *tele,* afar off, *graphein,* to write, an apparatus for communicating intelligence rapidly at great distances.

(*Continued from page 42.*)

1660.—Guericke (Otto Von), a burgomaster of Magdeburg, Prussian-Saxony, constructs the first frictional electric machine, consisting of a globe of sulphur, mounted upon a revolving axis and which, when rubbed by a cloth pressed against it by the hand, emits sound and light. It was Von Guericke who "heard the first sound and saw the first light in artificially excited electricity." He showed that if light bodies are suspended within the sphere of action of an excited electric, they, themselves, become possessed of electrical excitation.

1661.—Somerset (Edward), second Marquis of Worcester, an English inventor, announces in his "Century of Inventions," that he has discovered a method, which he does not however describe, by means of which he says it is possible to hold communications at a distance "by night as well as by day, though as dark as pitch is black."

1662.—Kirchen (Athanasius), a learned German, alludes in his *Magnes, sive de arte magnetica,* to the possibility of corresponding at very short distances by employing two spherical vessels bearing all the letters of the alphabet, each letter having suspended from it a magnetized figure upon a vertical wire.

1665.—Glanvill (Joseph), an eminent English divine and philosopher, endorses, in his *Scepsis Scientifica,* the views advanced some years previously by the Jesuit Leurechon. In Chap. XIX. he expresses the belief that "to confer at the distance of the Indies by sympathetic conveyances may be as usual to future times as to us in literary correspondence."

1675.—Boyle (Robert), Irish natural philosopher and chemist, gives in his *Recueil,* the result of his experiments upon the origin of electricity. He concludes that electrical attractions are not the effects of a mere quality, but of a substantial emanation from the attracting body. He improves upon some of Von Guericke's inventions and discovers, by means of a suspended needle, that amber retains its attractive power after the friction which excited it has ceased.

1675.—Newton (Sir Isaac), prominent English mathematician and natural philosopher, communicates to the Royal Society his discovery that excited glass will attract light bodies even to the surface opposite to that upon which it has been rubbed. He improves the electric machine by substituting a glass globe for the globe of sulphur used by both Von Guericke and Boyle, the rubbers in both cases being the hands of the operator. He appears to have anticipated Franklin's great discovery, judging by the following extract from a letter he addressed in 1716 to Dr. Law, in Suffolk. " . . . . . I have been much amused by ye singular phenomena resulting from bringing of a needle into contact with a piece of amber or resin fricated on silke clothe—ye flame putteth me in mind of sheet lighting on a small (how very small) scale. But I shall in my epistles abjure philosophy, whereof, when I come down to Sakly, I'll give you enow." In his *Principia,* he makes mention of the neutralizing effect of the interposition of an iron plate between a magnet and a body acted upon by it. He also alludes to a magnet weighing but three grains, which he wore in a ring and which is said to have raised 746 grains, or 250 times its own weight.

1676.—Haward relates an instance where a violent thunder-storm reversed the polarity of the compass needles.

1683.—Halley (Dr. Edmund), who was sent out by the Government of William and Mary to make observations on magnetic declination, publishes his theory of terrestrial magnetism, wherein he makes the first recorded attempt to systematize the different variable directions of the magnetic needle. He says that the earth's magnetism is caused by four poles of attraction, two of them being near each pole of the earth. One of the magnetic poles he places near the meridian of Lands' End, not above seven degrees from the North Pole, the other being about fifteen degrees from the North Pole in the meridian of California, while the two south magnetic poles are placed respectively about sixteen and about twenty degrees from the South Pole of the earth, and ninety-five degrees west, one hundred and twenty degrees east of London.

1684.—Hooke (Dr. Robert), English natural philosopher, gives the earliest well-defined plan of telegraphic transmission in a paper addressed to the Royal Society, "showing a way how to communicate one's mind at great distances. . . . 40, 100, 120, etc., miles, . . . in as short a time almost as a man can write what he would have sent." His apparatus consisted of an elevated frame-work supporting an open screen, behind which were suspended as many wooden devices or symbols, such as circles, squares, triangles, etc., as there were letters in the alphabet. In the day time, these devices were drawn up by a rope behind the screen and made visible in the open space, whilst during the night use was made of torches, lanterns or lights. Hooke also showed in 1684, that iron rods can be magnetized by rapidly heating and cooling them in the magnetic meridian. But, what is still more singular, he had, even previous to that date, alluded to the possibility of telephoning, that is, communicating sound through a wire. He thus expresses himself: "And as glasses have highly promoted our seeing, so it is not improbable that there may be found many mechanical inventions to improve our other senses, of hearing, smelling, tasting, touching. 'Tis not impossible to hear a whisper a furlong's distance, it having been already done; and perhaps the nature of the thing would not make it more impossible, though that furlong should be ten times multiplied. And though some famous authors have affirmed it impossible to hear through the

thinnest plates of Muscovy glass, I know a way by which it is easy to hear one speak through a wall a yard thick. It has not yet been examined how far acoustics may be improved, nor what other ways there may be of quickening our hearing, or conveying sound through other bodies than the air, for that is not the only medium. I can assure the reader that I have, by the help of a distended wire, propagated the sound to a very considerable distance in an instant, or with as seemingly quick a motion as that of light, at least, incomparably swifter than that which at the same time was propagated through the air, and this not only in a straight line, or direct, but in one bended in many angles."

1693.—Gregory (David), who became professor of astronomy in Oxford mainly through the influence of Newton, communicates in a volume of notes and commentaries the result of his observations on the laws of magnetic action.

1700.—Morgagni (Giovanni Battista), while practicing medicine at Bologna and at Venice, uses the magnet to remove particles of iron which had accidentally fallen into the eyes.

1700.—Duverney (Joseph Guichard), an eminent French anatomist, knew at this date that the limbs of a frog are convulsed by the electric current, as shown in the *Histoire de l'Académie des Sciences*, 1700, p. 40.

1702.—Kaempfer (Engelbrecht), German physician, describes in his *Amaenitates Exoticae*, experiments made by him upon the electric torpedo. He insists that any person may avoid all sensation of the shock by merely holding the breath while touching the animal. This apparently improbable fact has since been confirmed, however, by many scientists; the accurate observations of Mr. Walsh on the subject, reported in the *Phil. Trans.* for 1873–74–75, claiming especial attention.

1704.—Amontons (Guillaume), an ingenious French mechanican, exhibits before the royal family of France and before the members of the *Académie des Sciences*, his system of communicating intelligence between distant points through the agency of magnifying glasses—telescopes. The *Mémoires de l'Académie*, 1698–1705, contain an account of his many scientific productions.

.—Wall (Dr. William), a prominent English divine, communicates to the Royal Society the result of his experiments, showing him to have been the first to suspect the identity of lightning and electricity. He finds that, upon rubbing large pieces of amber against woollen cloths, he develops "a prodigious number of little cracklings accompanied by little flashes of light . . . . which seem in some degree to represent thunder and lightning."

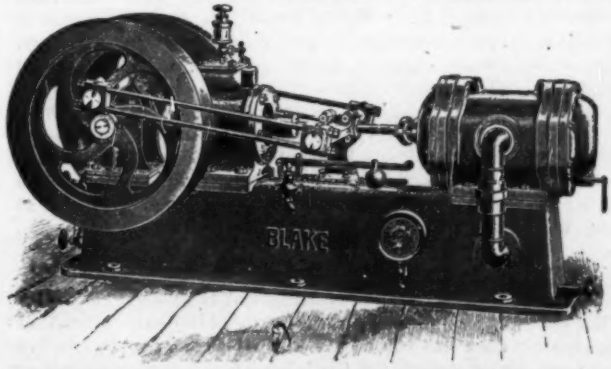
1709.—Hauksbee (Francis), English natural philosopher, is the first to mark the circumstanees of electrical attraction and repulsion, and to notice the production of light by friction in a vacuum. He observes that mercury shaken in glass vessels produces a light, in as strange a form as lightning, visible in the dark, and that, when the density of the air is diminished to one-half, the light becomes much more effective. But he cannot apparently determine if this is the result of the friction of the mercury against the glass or of the air. Nor does it occur to him upon another occasion that the light produced by the rubbing of glass against glass is electrical. In the powerful electrical machine which he constructed, Von Guericke's sulphur globe was replaced by one of glass, as had already been done by Sir Isaac Newton. It is said that the French astronomer, Jean Picard, had many years before observed light in the vacuous portion of a barometer which he was carrying from the Paris Observatory. Hauksbee also gave some attention to the study of the laws of magnetic force, and the results published in the *Phil. Trans.*, 1712, Vol. XXVII., giving a law of force varying as the sesquiduplicate ratio of the distances, were subsequently confirmed by Taylor and by Whiston in the *Phil. Trans.* for 1721.

1720.—Grey, or Gray (Stephen), a pensioner of the Charter House and Fellow of the Royal Society, makes known in the *Phil. Trans.* the details of the important line of investigation which, subsequently, with the aid of his friend Wheeler, (Wheler) led to the discovery of the principle of electric conduction and insulation, as well as to the fact, not the principle, of induction. During the months of June, 1729, and August, 1730, Grey and Wheeler succeeded in transmitting electricity, through packthread supported by silken cords, and through wire, at distances of over eight hundred feet. With reference to the cracklings and flashes of light, "electric fire" or sparks, which he develops pretty much in the same manner Wall did, he remarks: " . . . . though these effects are at present only minute, it is probable that in time there may be found out a way to collect a greater quantity of electric fire, and, consequently, to increase the force of that power which by several of those experiments, if we are permitted to compare great things with small, seems to be of the same nature with that of thunder and lightning."

(*To be continued.*)

Slipping Hose Tubes After Curing.

AN inquiry comes to the office as to how hose tubes are slipped off the mandrels that they are made on after curing. We give below an illustration of a machine which is familiar to almost every "hose man"—the Blake Air-Compressor. It simply pumps air into



a strong metal chamber, and the hose makers draw it off through a flexible pipe and force it between the hose-tube and the mandrel. The result is the tube expands and, cushioned by air, slides easily off the iron rod, effecting a great saving of time and doing away entirely with the ancient struggles of the hose makers in stripping the tubes.

—The Treasury Department has affirmed the assessment by Collector at New York at 35 per cent. and 50 per cent. *ad valorem* on part rubber fabrics (webbing), on the appeals of C. M. Vom Baur, per Alaska, July 20th; Etruria, May 18th; Nevada, September 18th.

Current Gleanings.

BY LIGHTNING ARRESTER.

MR. GEORGE WESTINGHOUSE, JR., makes an excellent reply in the current number of the *North American Review*, to Mr. Edison's article on "The Dangers of Electric Lighting," published in the November number. Mr. Westinghouse demolishes many of Mr. Edison's arguments, and boldly strikes out to show that the alternating current is safer than the continuous *to the consumer*, as before entering the building the high tension of one or two thousand volts is converted into a low tension of fifty volts.

* * *

In reality, the whole question lies in a nutshell. The high-tension alternating system is an improvement and an advancement in the science of electric lighting, and on account of its greater economy and flexibility of distribution, it has undoubtedly "come to stay." Mr. Edison goes to extremes in painting the dangers attending the use of high-tension alternating currents, and is scarcely justified when he disclaims the idea of being an alarmist. Dangers exist without doubt, but good construction and careful supervision of the work should be able to cope with them, and now that the necessity has been so painfully accentuated, they doubtlessly will.

* * *

A careful reader of a literary turn of mind on perusing Mr. Westinghouse's article, would notice a strong tendency on the part of the writer to run to hyphens in many places where custom and precedent do not justify their use. A few instances of this trifling peculiarity, selected at random, are: "Electric-light," "gas-distibution," "net-work," etc. One double-barrelled expression used by Mr. Westinghouse struck me, however, as peculiarly appropriate, It occurs in this sentence: "The success of properly-constructed underground systems, whether for currents of high or low tension, has been established beyond question." If only that qualificative of "properly-constructed" were applicable to all the overhead systems, if only those in charge had taken care that all the outdoor work had been constructed properly, and the adverb and hyphen had never been absent from their minds, we should have heard far less of the "deadly wires" than we have heard, and the present bitter discussion would probably have been "indefinitely-postponed."

* * *

"Mr. Wright, do you know what 'electrostatic capacity' is?" was the query recently addressed to the manager of a prominent wire-manufacturing firm, the speaker being an engineer occupied in electric lighting only. "Well, I know quite enough about it to be quite sure that it won't trouble *you* very much," was the reply. Just so; electrostatic capacity, the evil genius of the telegraph, and especially, of the telephone engineer, is an electrical phenomenon of which the electric light man, securely fortified behind his hundreds and thousands of volts and his tens and hundreds of amperes, can afford to take no notice. But that other property of electrical conductors which is nearly always spoken of in connection with electrostatic capacity, namely, insulation resistance, is one to which electric lighting engineers ought to pay more attention than many of them do at present.

* * *

The dinner of the Institution of Electrical Engineers, celebrated in London last month, was a great success. After such a brilliant inauguration the event will no doubt be repeated annually, as has long been the custom of the Civil Engineers. Such meetings as these serve a useful purpose beyond the transitory pleasure afforded by a social gathering together round the festive board of a number of men who usually only meet in their professional capacities, or for the discussion of scientific subjects. By the publication of speeches made on these occasions by distinguished guests, public attention is attracted to the achievements of the hosts in a most favorable manner. Nine newspaper readers out of ten will not stop to read any ordinary account of scientific doings, but a far greater proportion will follow with interest the speeches of famous men, and electrical engineering just now requires all the favorable mention that can possibly be bestowed upon it. At any rate, such speeches as those of Lord Salisbury are very pleasant reading to turn to after wading through a few columns of "deadly wire" literature, which has become so unpleasantly prominent of late.

* * *

It is to be hoped that the American Institute of Electrical Engineers will follow the lead of its English namesake and make an institution of the annual dinner. There is little doubt that the idea would receive ample support from the members, and no doubt a sufficient number of distinguished guests possessed of oratorical powers could be induced to attend to give the event a due amount of *eclat* and resonance.

* * *

It is rather curious that the very dinner of the Institution of Electrical Engineers, which was such a pronounced success, should have been the cause of, or rather the pretext for, a threatened schism in the ranks of the Institution. The Institution was founded as the Society of Telegraph Engineers, and in the early days of its life consisted chiefly of telegraph men. Lately the telegraph members have complained from time to time that "the professors" are crowding them out, both as regards representation on the council and the subjects brought up for discussion. After the dinner the quarrel has broken out with renewed vigor, and the submarine cable members are especially bitter because Sir John Pender, the leading spirit of the "cable ring," was not invited to be present as a distinguished guest. A good deal of talk has been heard about a general secession of telegraph men, in order to form a distinct society. Little would be gained by such action, especially by the cable men, who seem to be the chief complainants, as of all subjects discussed at the meetings of the Institution, submarine telegraphy has been the most neglected; the reason being that the men engaged in the practical carrying out of the work do not come forward with the results of their experience. Therefore it seems inconsistent to blame the management of the Institution for neglecting cable and telegraph interests, and absurd to imagine that a separate society supported by those branches of the science alone could have a useful or prosperous career.

* * *

One complaint made against the Council was that no member representing the telephone interests had ever been elected to it. The reason of this is, though no doubt the complainant was ignorant of it, that formerly the principal telephone company of England refused to allow their officials to bring forward any paper on telephonic subjects to be discussed publicly, and at one time even forbade the employees to attend the meetings of the Institution.

* * *

The Grand Jury hit the Board of Electrical Control pretty hard in characterizing that body as "negligent, as well as incompetent." Altogether the Board seems to have sunk pretty deep into the mire, and as it is nobody's business to lend a hand and help the trio of incompetents out of the fix, the probabilities are that before long we shall have heard the last of them in their official capacities. The amount of friction that the members of the Board have managed to create around them is astonishing. It goes without saying that the electric companies entertain anything but friendly feelings for them; the Commissioner of Public Works will have nothing to do with them, and lately a deadlock has come about between the Mayor and the Commissioners; consequently no meetings have been called for some time past. About the only thing left for the Commissioners to do is to make as graceful an exit as possible.

* * *

At Chelmsford, England, the City Council, on the recommendation of the Lighting Committee, decided that certain overhead electric light wires ought to be placed underground. A resolution was accordingly moved and carried to the effect that the work should be done, the extra expense (estimated at $100) *to be paid by the Council.* This is certainly a novel, and on the part of the Council, very generous way of treating the overhead wire question.

Transmission of Power by Rubber Belting.*

BY JAMES BENNETT FORSYTH.

TO obtain the full power and longest service from belting, great care should be taken in arranging shafting and pulleys. The shafting should be perfectly level and parallel. The pulleys should be in line with each other and turned smooth and balanced. The pulleys should be as large as circumstances will permit, and their diameter should invariably be increased as the thickness or number of plies of the belt is increased. The reason for this is that, in order to bend around a pulley, the outside of the belt must stretch and the inside compress. As the amount of stretch and compression is always the same for a given thickness of belt on a given arc of contact, it follows that the larger the pulley the less the stretch or compression for a foot of belt, and the longer the belt should wear.

Increasing the diameter of the pulley increases the power; therefore a light belt on a large pulley is much preferable to, and more economical than, a thick belt on a small pulley. *Large pulleys and high-speed belts* are preferable. From 1,000 to 4,000 feet per minute, for light counter to heavy driving belts on fair-size pulleys, is not excessive speed.

Moderately long belts are preferable to short ones. If the diameter of the pulley *cannot* be increased when more power is wanted, the belt should be made *wider rather than thicker;* if thicker it might not even give as good satisfaction as the thinner. Running one thin belt on top of another, the inner one a little slack, is sometimes advantageous, giving two flexible instead of one thick stiff belt.

A four-ply rubber belt is equal to a single leather belt, and a six-ply rubber is equal to a double leather. Double belts do not transmit twice the power of single. Rubber belts, being very flexible, come quickly to perfect contact with the pulley, and give great adhesion. Adhesion is increased by carefully covering the pulleys with a piece of belting. Vertical belts require extra tension to obtain sufficient friction on lower pulley. Excessive tension on a belt is injurious. Horizontal belts, and belts running at an angle of forty-five degrees or less, should have the lower side the tight or pulling side where possible.

For main driving and counter belts, pulleys should have a slight crown of face not to exceed one-sixteenth of an inch to a foot in width; too much crowning is injurious to the belt. If the crown does not exceed one-sixteenth inch per foot of width, the seam side of rubber belting, of the ordinary make, should be run on the outside, not next to the pulley. If the crown exceeds this amount, the seam should be run on the inside, or next to the pulley. With my new patented seamless belting it makes no difference which side is run on the pulley. Use large pulleys and avoid binders.

A good condition—High speed, low tension, reduced width.

In fitting a rubber belt, cut it three-sixteenths to one-quarter inch short for every foot in length; after it has been run from three to four weeks, take up the slack and it will not soon require shortening.

It is safe to assume that a 4-ply belt with a tension of 60 pounds per inch of width will be durable and do good service on a 24-inch pulley, and so on. See Figures 4, 5 and 6.

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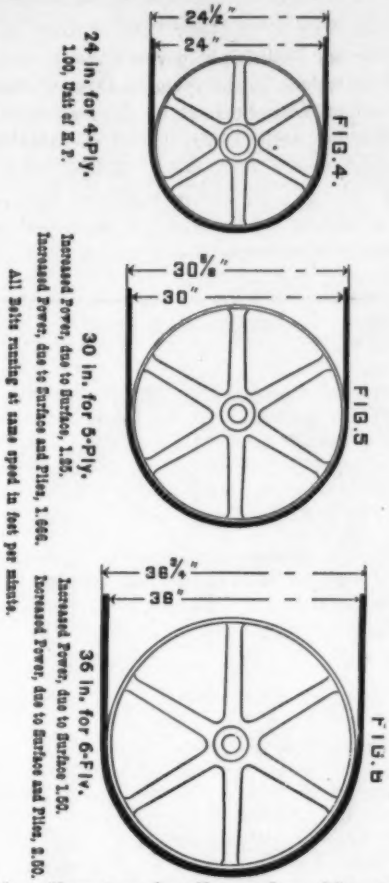

With no less diameter of pulley and working tension than above-named and at the same rate of speed in feet per minute, the 5-ply will deliver ⅓ more, the 6-ply ½ more, the 7-ply twice and the 8-ply 2⅓ times as much as the 4-ply would *on these larger diameter of pulleys.* And we give the following rules for horse-power and widths of belting.

TO FIND THE HORSE-POWER OF ANY BELT—Multiply the length of the arc of contact (on smallest pulley) in feet by the width of belt in inches, and this product by the speed in feet per minute; divide this product by 5500, and the quotient will be the horse-power of a 4-ply belt. Multiply this power by 1.333 for power of 5-ply, by 1.666 for power of 6-ply, by 2 for power of 7-ply, and by 2.333 for power of 8-ply belt.

EXAMPLE.

A 20 inch 4-ply belt running 2,000 feet per minute, with an arc of contact (on smallest pulley) of 10 feet, will gi 72.73 H. P.

10 feet arc of contact,
20 inches wide.
200
2000 speed in feet.
5500)400000
72.73 H. P. for a 4-ply.

If for a 5-ply, multiply 72.73x1.333=96.95 H. P.
If for a 6-ply, multiply 72.73x1.666=121.17 H. P.
If for a 7-ply, multiply 72.73x2=145.46 H. P.
If for an 8-ply, multiply 72.73x2.333=169.6 H. P.

TO FIND THE WIDTH OF BELT REQUIRED TO DO A GIVEN AMOUNT OF WORK.—Multiply given horse-power by 5500, and divide this product by the speed in feet per minute; then divide the quotient thus obtained by the length of the arc of contact (on smallest pulley) in feet, and the quotient will be the width in inches of a 4-ply belt. Multiply this width by .75 for width of 5-ply, by .6 for width of 6-ply, by .5 for width of 7-ply, and by .43 for width of 8-ply belt required to do the same amount of work.

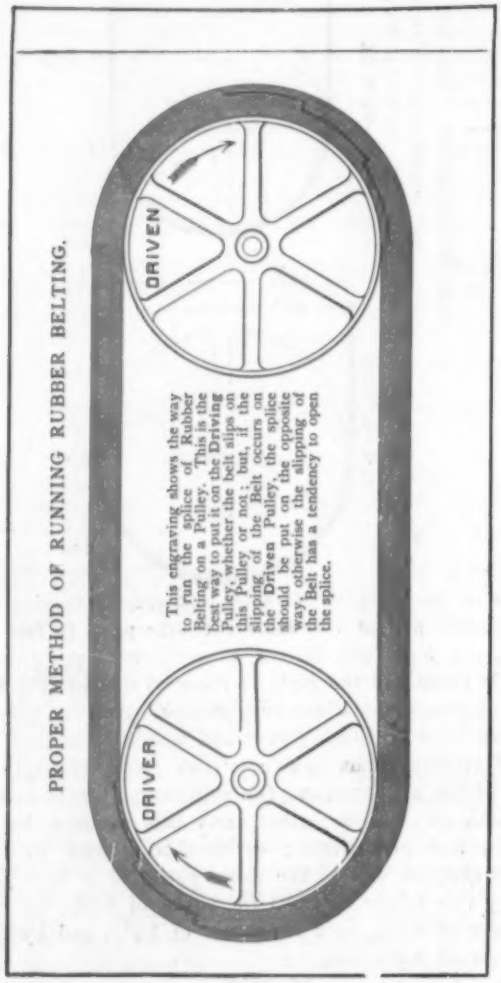
PROPER METHOD OF RUNNING RUBBER BELTING.
DRIVEN
This engraving shows the way to run the splice of Rubber Belting on a Pulley. This is the best way to put it on the Driving Pulley, whether the belt slips on this Pulley or not; but, if the slipping of the Belt occurs on the Driven Pulley, the splice should be put on the opposite way, otherwise the slipping of the Belt has a tendency to open the splice.
DRIVER

Table showing proper increase of power due to the diameter of pulleys and different thicknesses of belt running at same speed per minute.

THICKNESS OF BELT.	TENSION.	DIAMETER OF PULLEY.	POWER DELIVERED.
4-Ply.	60 lbs.	24 in.	1.00
"	"	30 in.	1.25
"	"	36 in.	1.50
"	"	42 in.	1.75
"	"	48 in.	2.00
5-Ply.	80 lbs.	30 in.	1.666
6-Ply.	100 lbs.	36 in.	2.50
7-Ply.	120 lbs.	42 in.	3.50
8-Ply.	140 lbs.	48 in.	4.666

[Mr. Forsyth has embodied this article in a very attractive pamphlet, containing additional illustrations with more detailed information, of value to foremen and superintendents of factories and mills, and the Boston Belting Company are publishers of it. They will take pleasure in mailing a copy of it without charge to any one who is interested in the subject, either as a user or dealer in rubber belting.—ED. WORLD.]

Review of the Markets.

THE first news of the revolution in Brazil four weeks ago caused some alarm in rubber circles, but so soon as the cables began to bring definite information as to what had occurred, the market regained a healthy tone and this has been sustained ever since. At Para and in all the European markets, prices have ruled very firm with an advancing tendency. Here in New York the tendency has been bullish throughout the month, and current receipts have scarcely no more than kept pace with consumption; thus keeping stocks down to the low range last reported. The fact, however, that our manufacturers had pretty generally provided themselves with supplies to January 1st, and the near approach of the holidays and the season for closing down to take stock, have had a tendency to counteract the upward movement; and consequently, while prices are slightly higher than a month ago, and while stocks are held rather firmly, the advance does not exceed 10 to 15 per cent.

In gutta percha the heavy demands for ocean cable work continue to stimulate values abnormally and prices are nominal.

Mr. Edward Simpson, of Simpson & Beers, brokers in crude india rubber and commercial paper, 58 William street, give us the following interesting review of the money market, viz.:

About the middle of August rates for time loans and for four and six months' paper advanced from 4 and 5 per cent. to 6 per cent., owing to the banks preparing to meet the fall trade demands, which this year have been unusually large, as the grain crops were extensive, and that of cotton the greatest ever raised. The diversion of money South and West has caused the most prolonged stringency that I remember in twenty years' business in the commercial paper line. It has been worse than the two or three panics we had, for in thirty days the money market has recovered from the effect of these. Our best single and double name rubber notes, three to six months to run, have been obtainable at 6 and 7 per cent., but it has been almost impossible to place them, our banks finding it all or more than they could do to supply the wants of their customers, and occasional sales were only made at 7 per cent.

There has been no pressure to effect sales, holders preferring to wait for easier money. There has been also only a moderate demand from out-of-town banks, mostly made at 7 per cent. Money is now beginning to return from the South and West, and with the new year there will probably be a free outlet for our best paper at 5½ to 6 per cent., and the writer predicts a comfortable 6 per cent. market for time paper until the Spring.

LATER.

As we go to press, the cable brings news that the Provincial Government of Para—not the Brazilian General Government—has granted to the Companhia Mercantil, a private corporation, controlled by J. C. G. Vianna, Baron of Gondoris, a concession of 20 reis (⅓ of a cent) per pound on all rubber exported from Para, the concession to take effect January 1st, 1890. With this concession in his favor, Vianna represents that he can command sufficient capital to control the Para rubber market, and raise the price to such a figure as will give the Provincial Government largely increased revenue, not to mention a rich profit to himself. In other words, it is a scheme of deliberate collusion between Vianna and the Government for purposes of barefaced robbery. Active steps are now taking to present formal and vigorous protest against the outrage, and the aid of our National Government will be invoked in the effort to have the order rescinded before it takes effect. Meantime, the market here is very unsettled, and prices are nominal. We, therefore, omit quotations.

For "Want" Department, See Page XXII.